CANADIAN GEOGRAPHICAL JOURNAL

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As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography—historical, physical and economic—first of Canada, then of the British Empire and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young, as well as informative to the adult.

The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is three dollars in Canada.

The Society has no political or other sectional associations, and is responsible only to its members. All money received is used in producing the Canadian Geographical Journal and in carrying on such other activities for the advancement of geographical knowledge as funds of the Society may permit.

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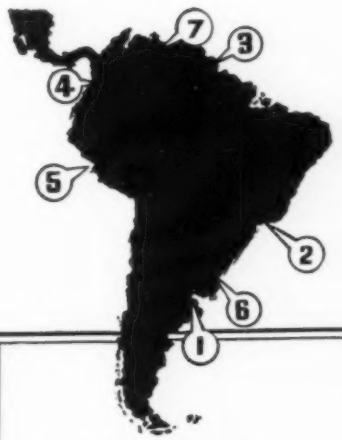

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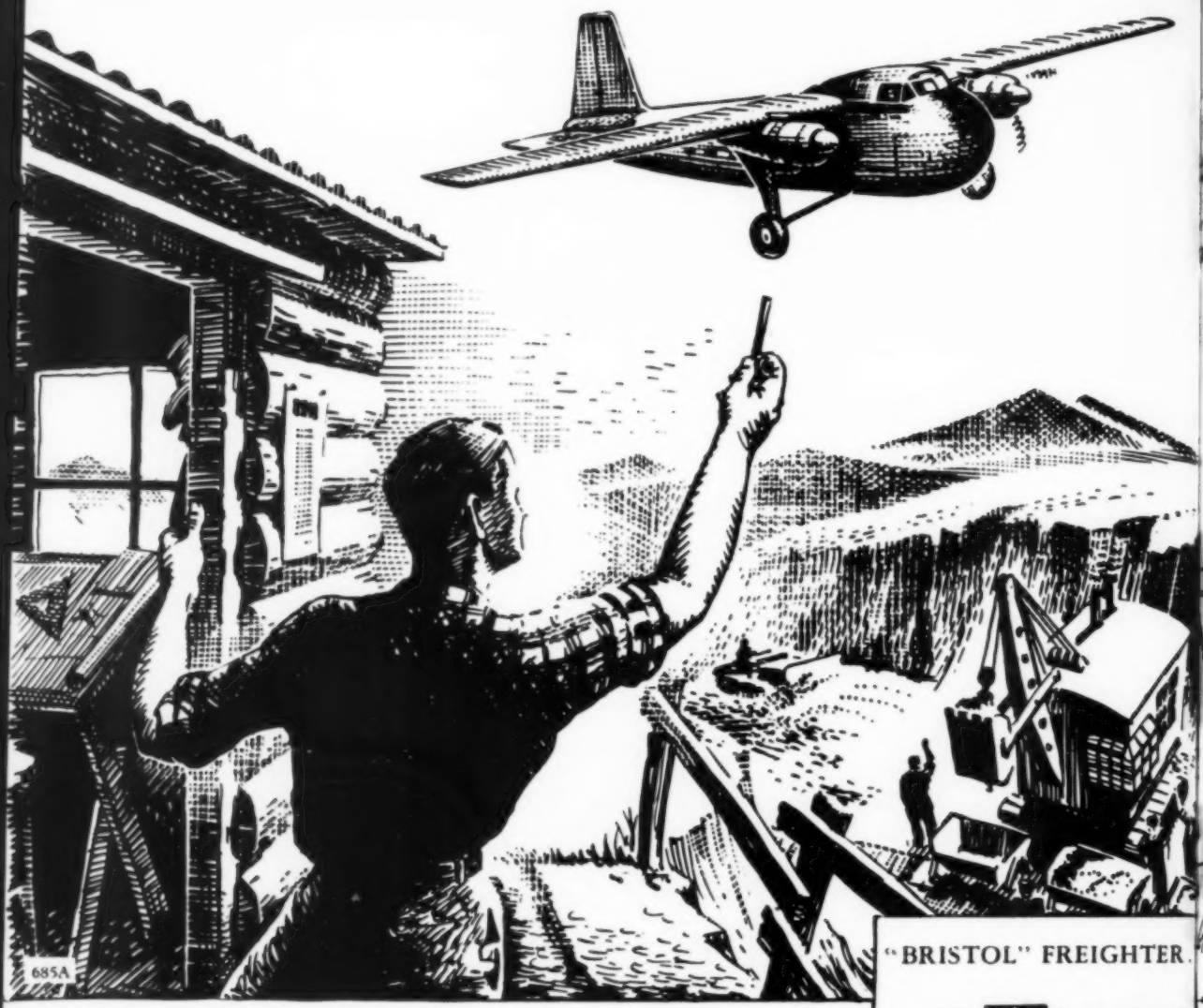

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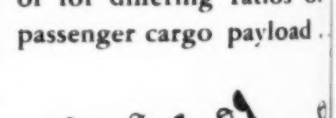

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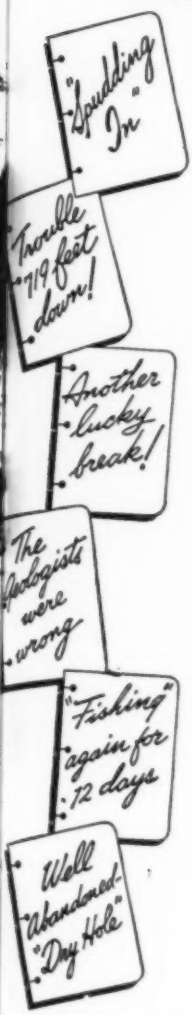
INTERESTING FACTS ABOUT OIL

PAGES FROM AN OIL DRILLER'S "LOG" TELL

The Story of a Failure



March 24th, 1943, "spudding in"... a big day for the drilling crew. 136-foot derrick completed, we started drilling Imperial Oil's "Royalite Wildcat Hills Well No. 1"—due north of Calgary-Banff highway, 35 miles from Calgary. Hoping for a real "strike" . . . geologists' survey indicates favorable oil structure at about 7,000 to 9,000 feet.

Trouble 719 feet down! Lost drill collar[1] in the hole. Might have been *bad*—but recovered collar and repaired break in drill shaft in 3 hours. Everybody breathed a big sigh of relief—sometimes this kind of accident sets us back days.

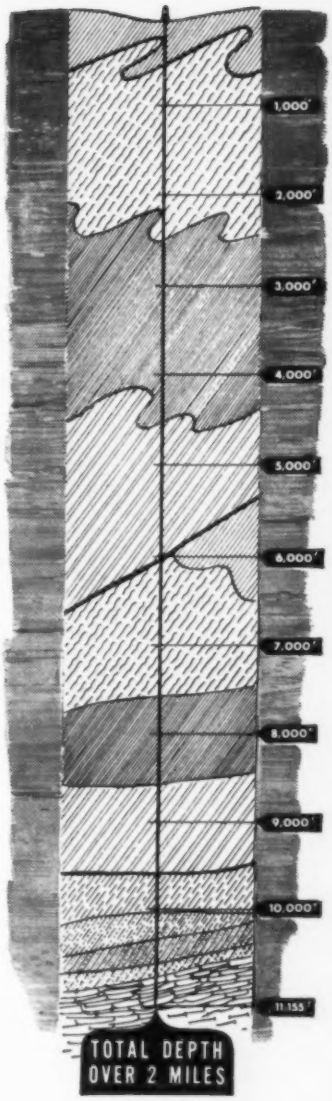
Another lucky break! Drill pipe "washed out" and twisted off at 775 feet. Luckily we got going once more in two hours. Using up plenty of drills on this hard rock. It's no easy job—pulling up hundreds of feet of pipe just to change a dull "bit"[2] then lowering the whole "string" again.

The geologists were wrong. Now drilling 2 miles underground, and these have been trying, disappointing months. Nature *can* fool the geologists. On this well, for instance, we expected to hit the formation we hoped would contain oil before this. Instead, one bad "fault"[3] after another—quite unexpected. On top of all that—got stuck in hole at 10,676 feet, taking eleven days to fish up drill pipes and repair.

"Fishing" again for 12 days. Stalled again at 10,688 feet—lost 12 days drilling out stuck tubing. But we still have hopes . . . a "strike" will pay back all the months of hard work and money invested.

April 21st, 1944, well abandoned--"Dry Hole". A black day for all of us. After 13 months' hard drilling, we struck salt water. Wet as salt water is, it's still the oil man's Nemesis—a "dry hole" that produces no oil. So we plugged the well[4] at 11,155 feet down and abandoned it—a grave two miles deep for all our hopes of "Wildcat Hills No. 1."

1—Collar supports drill in underground hole.
2—More than 400 drilling bits were used in sinking the well.
3—A "fault" is a break in the earth's structure—a dislocation of the rock formation.
4—Cement plugs are inserted in the hole as required.



The facts in this record are taken from the drilling log of Imperial's "Wildcat Hills Well No. 1", which was begun on the favorable recommendation of Canada's leading oil geologists, who had explored the ground thoroughly. Estimated to cost $225,000. for drilling, it actually cost approximately $340,000. from start to "dry hole" finish. But the drillers and geologists of Imperial Oil go on undiscouraged—because they know that in opening up Canada's promising oil fields they add much to the nation's wealth . . . and help to make Canada ever more independent of foreign sources of the petroleum so indispensable to the life of our country and every one of its individual citizens.

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"Early Morning, Baie St. Paul", reproduced from an oil by the late Clarence Gagnon.

CANADIAN GEOGRAPHICAL JOURNAL

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This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustrations, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth and other parts of the world in which Canada has special interest.

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The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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AMONGST THE NEW BOOKS IX

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A dramatic picture of the war-scarred 450-foot tower of St. Stephan's Cathedral in Vienna. This magnificent Gothic edifice dates from the fourteenth and fifteenth centuries, but incorporates fragments of the original building destroyed by fire in 1193. Most of the damage was caused during the siege of Vienna in April, 1945. Before the Nazis withdrew from the city they burned the interior of the church; the main parts of the ancient building, however, still stand, and can be repaired.

Associated Press photo

The Rebirth of Austria

by PAUL MALLES

ALTHOUGH THE Republic of Austria is a very small country, even by European standards (covering 32,369 square miles, which is just a little more than the provinces of New Brunswick and Prince Edward Island together), it has always played a very important role in the history of Europe. Stretching from the Bavarian and Bohemian table lands in the north to the gigantic granite and limestone masses of the Alps which divide the continent from two of its three great peninsulas in the south, it was for more than 600 years the core of a great empire.

The Moscow Declaration

Peace in Austria was always essential for peace in Europe. This little country has the tragic distinction of having been the ignition point of two world wars. The southern Slavic revolution against the rule of the Habsburgs sent up the spark which brought the Great Power tension of 1914 to explosion. Twenty years later, Mussolini's megalomaniacal dreams of a neo-Roman empire led to a civil war in Austria, in which the first cannon shots of World War II were fired, paving the way for Hitler's first conquest—the annexation of the country to the Third Reich in 1938.

Recognizing the strategic and political importance of the alpine republic, the representatives of the three great powers, Great Britain, Soviet Russia and the United States, declared at their meeting in Moscow on October 30, 1943, at a moment when their troops began to converge upon the country from the south and east, that they wished to "see re-established a free and independent Austria . . . however, that she (Austria) has a responsibility . . . for participation in the war on the side of Hitlerite Germany, and that in the final settlement account will inevitably be taken of her own contribution to her liberation".

Dr. Karl Renner—newly-elected President of the Republic of Austria

The Austrian Resistance Movement

The Moscow Declaration resulted immediately in an increase in the intensity of the Austrian resistance movement. Very few facts about the underground struggle in Austria during the German occupation are known to the outside world. The Nazis, regarding the country as an integral part of the Third Reich, and acting under the pretence that they had annexed it with the approval of the Austrian people, made every effort to conceal the extent of their terror regime. Yet occasional glimpses were permitted. Obviously in an attempt to frighten the population, the Nazis published, during a few months in 1943, the names of men and women who had been executed or imprisoned for political reasons. Covering a period of not more than nine weeks, the number reached into the three-hundreds. After the liberation of Vienna it was revealed that between March, 1938, and April, 1945, 6,000 men and women were executed in the Vienna Central Prison alone. Many more thousands perished in concentration camps, especially the notorious camp at Mauthausen in Upper Austria. As late as April 28, 1945, forty political prisoners, whose names are known, were killed there by gas on the express orders of the local Nazi *Gauleiter*. The majority of

C.G.J.map

The Republic of Austria—with boundaries as established by the Peace Treaty of St. Germain after World War I. The shaded parts represent the approximate extent of the Austrian claim to South Tyrol and the Yugoslavian claim to part of the Province of Caryntha. The Austrian claim to South Tyrol involves only the German-speaking section.

the executed and imprisoned resistance fighters were industrial workers—many of them railway employees—who had observed orders via British and Russian radio stations to sabotage and slow up the Nazi war machine. After the Moscow Declaration the number of Austrian deserters on the Russian front increased from month to month. In the south, Austrians began to join the Yugoslavian partisan forces. When the Red Army finally crashed into the region of Vienna and Wiener Neustadt, Austrian resistance men joined up with it.

It is easy either to exaggerate or to underestimate the role of the Austrian underground in the struggle against Naziism. While the number of people executed, killed or imprisoned points to a resistance movement on a mass basis, there was undoubtedly a large percentage of Austrians serving the Nazis passively, if also grudgingly, and others were just as fanatical followers of Hitler as could be found in Germany. In any case, the policy which the Allies followed after the liberation of the country implied that they were ready to recognize the fulfilment of the obligations of the Austrian people as pronounced by the Moscow declaration. General Mark Clark, Commander of the American Occupation Forces, declared that Austria had been forced into the war after the Nazi invasion. He, therefore, considered it the task of the Allied Council in Austria to further the creation of an independent and democratic Austria. It is also significant that the Potsdam Declaration did not list Austria among the German satellite states.

The Basic Problems

An American correspondent in Vienna has stated the two basic problems which now face the country simply as these:

How is it going to be fed during the next year ?

What can be done so that its citizens can live and work in the future with some degree of prosperity and happiness ?

One can trust that as time goes on and communications are improved, industrial production will be brought into operation within certain limits and the food situation will be relieved, partly by Allied shipments, partly by the country's own produce. Thus the short-range problem of survival, which at present is the most urgent, will soon be relatively overshadowed by the long-range

problem of reconstructing Austria on a firm economic and political basis.

This is the second time in one generation that Austria has been faced with a reconstruction problem of tremendous difficulty. In 1918 the new small republic was burdened with an economic set-up which by a century-old development had been geared to serve an empire ten times larger. Government administration was out of proportion and had to be cut to more modest size; the complex banking system had lost most of its natural functions. Then, as now, industry was cut off from its raw-material sources and markets. Agriculture was in no way prepared to produce even the most direly needed foodstuffs.

During the twenty years of the First Republic the problem of readjustment was never adequately solved. A continuously shrinking industry created chronic unemployment which even in the year of the greatest post-war prosperity was about four times higher than in neighbouring Czechoslovakia. Foreign loans, which were contracted to stabilize the currency and to balance the budget, were just sufficient to help the governments of the day to muddle through without spurring them to any radical effort to seek a basic improvement. In this poverty-stricken atmosphere the political tension was correspondingly high. It was the fundamental economic sickness of the country which finally let it fall—first, into the hands of Mussolini, who left it a nominal independence, and, four years later, into the hands of Hitler, who incorporated it into the German Reich.

The fact that Austria, immediately after its occupation by the Germans, was hitched to the Nazi war machine had a profound influence upon its economic structure. During the period before the annexation, the prevailing trend had been an expansion of agriculture (the only favourable economic development) and a shrinkage of industry. Austrian agriculture advanced during the 'twenties and early 'thirties until it filled, in 1937, the following percentage of home demand:

Wheat	56.8 per cent
Rye	71.6 " "
Barley	85.6 " "
Oats	91.2 " "
Maize	33.4 " "
Potatoes	99.2 " "

Sugar production became sufficient to satisfy the entire domestic needs, of which in 1918, more than half had to be met from imports. Dairy production showed a growing surplus in the last decade before the Nazi invasion.

Austrian Economy under the Nazis

Subordinated to the needs of the Greater German Empire, Austrian economy reversed its trend sharply. The Nazi period was characterized by a serious decline in the agricultural output, as Austrian agriculture was ruthlessly exploited by food requisitioning. Austria's cattle were decimated. Lack of lumber forced the Nazis to dismiss all considerations of forest preservation with possibly disastrous results for the forest industry and soil conservation.

On the other hand, Austrian industry rapidly expanded after 1938. Large German investments were made in Austrian plants, especially the heavy industries. Steel production was modernized and intensified, iron-ore mining stepped up. New plants were created, notably the gigantic Hermann Goering Werke in Linz (Upper Austria). The backward automotive industry was reorganized, and an extensive aeroplane industry, non-existent before 1938, was created. The chemical and rayon industries were increased many times.

The Nazis made every effort to intensify Austria's output of raw material. They used the most modern methods to exploit her resources. In the Alps they reopened the old copper mines which had been closed down as unprofitable. Waterpower development, which had already made considerable progress during the pre-war years, was accelerated. The oil fields of Zistersdorf near Vienna, which, in 1937, had yielded only about 33,000 tons, gave, in 1943, a reported 1,200,000 tons, representing about half of the pre-war needs of the country.

Naturally, all this was done to help the

German war machine — not Austria — and had to be paid for heavily. Austrian industry lost its independence completely and was directed entirely from Berlin. In so far as Austrian capitalists were not removed altogether (as in the case of Jews and known anti-Nazis), they became subordinates of German trusts and cartels, and their enterprises were put under directorates in which Germans filled the majority of posts. Austria's highly skilled artisans and craftsmen, who had been the backbone of her valuable export industry in luxury goods, were forced to work in war plants. Small business was ruthlessly wiped out.

Viewed solely from the production and employment angle, Austria profited during the German occupation, though in a dubious way, from its incorporation in the German Reich. But any such advantages are now reversed. Production of war material has entirely ceased, of course. Most of the industrial machinery which the Germans installed in the country will probably be taken away for reparations as German property under the terms of the Potsdam Declaration. To a very large extent it has already been removed. As for the rest, Austria is to-day cut off from most of its sources of raw material and from its main markets, just as it was in 1918. Thus, quite apart from the immediate problem of food, fuel and shelter, she is faced with problems of economic reconversion and industrial demobilization far greater than those which she sought to master—but never did—after World War I.

The Reconstruction Problem

After the liberation, Austria reverted to her constitution of 1920, which provides for a set-up rather similar to that of Canada. Austria is a "federation" (*Bund*) of nine provinces with a division of rights and obligations between the Federal Government responsible to Parliament (*Nationalrat*) and Provincial Governments (*Landesregierung*) responsible to the Diets (*Landtag*). There is also a Senate, called Federal Council

View of the damage wrought in "Old Vienna". About 25 per cent of her houses have been destroyed, mainly during the fighting for liberation from the Germans, who fought a bitter delaying battle in the city streets. The industrial eastern area was hardest hit. Associated Press photo

A pre-war view of the Ringstrasse *encircling the inner part of the city. To the left is the Parliament Building, behind which is seen the Gothic steeple of the City Hall. The* Ringstrasse, *a boulevard two miles long and 150 feet wide, was built during the period 1860-64 to replace the original system of fortifications guarding the capital of the Austrian Empire.*

(*Bundesrat*) in which each province is represented according to the size of its population, the members being elected by the Diets according to party strength.

The provinces, of which the city of Vienna is one, are historic entities with marked differences in economic structure, cultural background and spoken dialects. There is a wide difference, for example, between the easternmost province of Burgenland, which for hundreds of years was under Hungarian rule, and the old peasant democracy of Tyrol. There is a tremendous gulf between cosmopolitan Vienna, not long ago the intellectual and political centre of a multinational empire, completely industrialized, and other provinces, mainly agricultural.

The population is very unevenly divided among the provinces. In Vienna alone is compressed nearly one-third of the Austrian people. Sixty per cent live in the provinces in and around Vienna, which are also the main industrial areas and the chief providers of grain, sugar, potatoes and fruits, while the mountainous western and southern provinces are devoted to cattle farming and the production of raw materials, especially iron ore and lumber. The only oil source—developed during the German occupation—is in Lower Austria near Vienna. Generally speaking, the eastern part of the country is incomparably more industrialized than the western part. Thus two counter currents have always been strong in Austrian politics. The cultural differences between the provinces fostered a desire for decentralization, their economic interdependency a trend towards centralization.

The present reconstruction problem can obviously be solved only on a national basis. The form in which the Allied occupation of Austria has been undertaken tends, unfortunately, to make this increasingly difficult. Like Germany, Austria has been divided into four, actually five, zones of occupation. Roughly speaking, of the nine provinces, the two eastern provinces of Burgenland and Lower Austria are in the Russian zone,

The ancient town of Innsbruck, capital of the mountainous province of Tyrol.

the two western provinces of Salzburg and Tyrol in the American, the westernmost province of Vorarlberg in the French, the southern provinces of Styria and Carynthia in the British zone*. Vienna itself is divided, as in the case of Berlin, into four zones, and is the seat of the Allied Control Council. It is obvious that this system serves to isolate the provinces from each other economically and politically and increases the difficulty of feeding the industrial population, especially in Vienna**. Another very unfortunate consequence of the lack of centralized authority during the first months after the liberation was that it gave Austria's neighbours the chance to load upon the country vast sums in worthless German currency.

The Two-party System

Regional differences have always contributed heavily to the political tension and strife in Austria. A thoroughly integrated and representative government is, therefore, an essential condition if the country is to be rebuilt on a sound political basis. There are two historical parties in existence, both products of the late 'eighties and early 'nineties of the last century. On the right there is the Catholic "Christian Social Party", which now has changed its name to "People's Party". It governed the country for most of the time during the First Republic and represented mainly the farming population and the urban middle classes. On the left there is the Social Democratic Party, a socialist party representing mainly, but not exclusively, the industrial workers. During the years preceding its suppression in 1934 it had made considerable progress in organizing farm labour and small farmers, especially in the wine-growing districts of Lower Austria and Burgenland.

The Social Democratic Party administered most of the larger urban municipalities. The Administration of Vienna became world famous for its municipal apartment buildings and social welfare work. The Christian Social Party was instrumental in expanding the system of agricultural co-operatives which contributed greatly to the favourable development of Austrian agriculture before the Nazi invasion. Regionally, the Social Democrats are strongest in the industrialized East, the Christian Social party in the agricultural West. Both parties, during the period of the First Republic, were engaged in a fierce contest for power which even involved them in a civil war in 1934. But there is no doubt that they have learned from the tragic experience of Nazi domination; they established, immediately after the

*The boundaries of the occupation zones do not always correspond to the provincial boundaries; for example, the Russian zone extends over part of Styria.

**An unofficial British source (*The Observer*, London) estimated the number of occupying troops in Austria at the end of 1945 to be approximately 950,000. Of these, 600,000 were said to be Russian, 200,000 American, 100,000 British and 50,000 French. The Russian and French troops rely almost entirely on local resources, while the American and British occupation armies are generally self-supporting. In addition, tens of thousands of refugees and deportees, mainly from Czechoslovakia and Poland, are harboured and fed in the country.

The old market square of Wiener Neustadt, typical of most small Austrian cities. Wiener Neustadt, being the centre of German aircraft manufacture in Austria during the war, was heavily bombed.

liberation, party co-operation in all provinces. A third party, the Communists, appeared for the first time in the history of Austria on a national scale after the fall of the Nazis. The old parties are, however, firmly entrenched, and the Communists do not constitute a serious threat to them.

Thanks to the virtually frictionless co-operation between the parties it was possible within eight months after liberation to hold the first free election in fifteen years. This election confirmed to a very large extent old party loyalties. The People's Party won over 1.5 million votes and 85 seats, the Socialists 1.4 million votes and 77 seats, and the Communists 175,000 votes and three seats. The Socialists were somewhat under-represented, partly because of the Communist split and partly because of the absence of thousands of male voters, who in Austria always leaned more to the Left, while the women's vote tended towards Conservatism. In the present elections about 62 per cent of the total vote was cast by women—an indication also of the extent of the manpower problem in Austrian economy. The vote was extraordinarily high, about 90 per cent of the eligible voters exercising their franchise.

Shortly after the liberation of Vienna a provisional government composed of all three parties had been formed under the leadership of Dr. Karl Renner, a Socialist and First Chancellor of the Republic, 1919-

The famous Karl Marx-Hof in Vienna, built as part of the municipal housing programme during the 1920's. Apartment blocks of this type house tens of thousands of the city's working-class families.

1922. Some months later it received *de facto* recognition by the occupying powers. As a result of the elections the chancellorship went to the young leader of the People's Party, Dr. Leopold Figl, who had spent sixty-two months in German concentration camps and was later active in the Underground. The coalition of the three parties was retained. Subsequently, in accordance with the Constitution, which provides for the election of the head of the State by Parliament, Dr. Karl Renner was unanimously chosen President of the Republic.

Reconstruction Plans

So far as plans for the rehabilitation of the Austrian economy are yet distinguishable, it will have to proceed on the following main lines. The industrial sector will have to be geared up for the production of farm machinery and tools for essential production, for manufacturing goods which can be traded with neighbouring countries for raw material and other essential imports, for supplying the Austrian people with products necessary for normal life, and for raising the general standard of living. In the agricultural sector the prevailing system of small and middle-sized farm units will be continued, because it is the only one by which it is possible to bring Austrian agriculture back to pre-war standards. The techniques of farm economy will have to be improved by mechanization where this is feasible, and by co-operative organization of farmers to make the utmost use of farm machinery and reduce waste of labour and products. The electrification of farms has to be pursued; agricultural storehouses, dairies, mills, canning industries and refrigeration projects on a co-operative basis to provide the necessary capital have to be established. A "full employment" programme, with the task of creating employment for the workers in former war industries, will have such objects as the development of all available water power, electrification of all railways, expansion of the high-

The Kaerntner Strasse, *Vienna's "Fifth Avenue"—internationally famous, before the war, as her fashion and luxury-goods shopping centre.*

A pre-war view of the Vienna Opera House, cultural centre of Austria's music—now damaged beyond repair.

way system, and promotion of housing projects to replace houses damaged by bombs or destroyed by fighting in the cities and to improve housing in rural areas. Such a programme is, however, of a long-range nature and depends upon supplies of raw material.

A Realistic Foreign Policy

An essential condition for the revival of Austria's independence is a realistic foreign policy which could be aptly described as "no foreign policy at all"—at least in so far as so-called "orientations" are concerned. The crux of Austrian policy during the past has been the basic disbelief of many Austrians in the future of their country. That, far more than any German nationalism, has been the reason for the movement favouring *Anschluss* to Germany. Another unsound feature of Austrian politics has been the desire of political parties to find backing for their internal policies outside the country. This was behind the insane "Rome-orientation" of the early 'thirties which led, finally, to the loss of independence in 1938. If Austria is to keep her newly-gained independence in more than name only, she needs to immunize herself against any attempt from inside or outside the country to draw her into a "bloc" system, under whatever disguise it may appear.

The relations between Austria and her small neighbours have, on the whole, improved steadily between the two wars, and there is no reason why she should not live in peace and friendship with them. For hundreds of years these nations have lived together — and struggled together — in the framework of a common state, and, while the political memory of this period may not be a particularly happy one for all concerned, this fact has created a distinct cultural relationship which is the really great inheritance of the old Empire. The most sublime

contribution of Austria to world culture, her music, is the product of the free play of interracial genius. It is Germanic as well as Roman, Slavic as well as Magyaric. The same is true of Austrian literature, architecture, and painting. In short, there is a common language between these nations, even if it is spoken in different tongues. Their way of life is similar. Their economies complement each other in many respects. In an average year (1930) Austria imported from her immediate neighbours (Germany not included) 50 per cent of her needs and sent them about 42 per cent of her exports, and that in spite of mutual trade barriers. If the neighbours of Austria have learned from their own catastrophies the value to themselves of Austria's independence, they will not again fall into the error of an industrial chauvinism which has been the greatest single cause of the economic and, therefore, political sickness of the First Austrian Republic.

In the absence of established currencies, trade between the countries of the Danubian Basin has, at first, to take the rather primitive form of bartering. Trade monopolies may not be welcome but are rather indispensable instruments for bringing order into the chaos of Central European trade relations. While they should remain temporary measures, they could be used for the reintegration of the economies of the whole Danubian region which has been disorganized since the end of World War I.

Territorial Disputes

Between Austria and her neighbours there are only two territorial questions in dispute. One is the claim of Marshal Tito's Yugoslavian Government for a part of Carynthia, and the other Austria's claim on Italy for South Tyrol.

The Carynthian territory was already under dispute after the last war and the question was settled by a plebiscite under Allied supervision. There exists a handful of Slovenian settlements on the Austrian side of the Karawanken, the great mountain range which constitutes the border between the two countries. But there are Austrian people living on the Yugoslavian side as well, and the Carynthian city of Klagenfurt, which is included in the claim, is purely Austrian and always has been.

The injustice to Austria of forcing her to cede South Tyrol to Italy by the Treaty of St. Germain has been pretty generally admitted. The only reason was to give Italy a defensible northern frontier. But with the elimination of Germany as a possible source of aggression, this reason is scarcely valid any longer.

Both these territorial questions are, however, of minor importance for all countries concerned, and an amiable settlement should not prove too difficult.

It is clear that however great may be the efforts of the Austrian people themselves to reconstruct their country politically and economically, they will not be able to do so without a certain amount of outside help. Austria will need such help mainly for two long-range purposes. She will need international assistance to stabilize her currency. She will also need long-term credits for the purpose of purchasing seed, cattle stock, farm and industrial machinery—in short the necessary tools for the realization of her reconstruction programme.

The reconstruction of Austria on a level where her citizens "can live and work with some degree of prosperity and happiness" is a problem for the solution of which there exist no short-cuts. Neither is there an absolute guarantee that the Second Republic will succeed where the First Republic failed. But the experiment can succeed if the powers, having learned the tragic lesson of the "Twenty Years of Crisis", recognize Austria as the nerve-centre of the Middle European system and underwrite her independence materially as well as politically; and, if the Austrian people themselves, having the will for independence in which they were sadly lacking after 1918, by hard work, co-operative effort, well-planned and realistic government, strive for that degree of prosperity the country can produce, even though it is by nature more endowed with beauty than with riches.

The Red Cross International Committee

Recipient of the Recently Awarded 1944 Nobel Peace Prize

by MARGARET MURPHY

"My dear Geneva, ho!

"If you know what joy and what relief I receive from you and a good news of home. You know it is a great joy for prisoners to receive home news. This letter makes me feel I am in Dahomey and my heart was very content. I laugh. I jump in great joy and read and read non-stop. That makes me good and not so bad.

"I hope that after war I pass visit you for a day to know you. Would that please you? I be happy if you send photograph as I like to know you by photo so I can recognize you."

"My dear Geneva, ho!" signifies the International Committee of the Red Cross at Geneva, Switzerland, and the French native soldier who wrote such a touching letter of thanks is only one of millions to whom the Committee brought joy and hope and comfort during the long years of the war.

Its work in World War II was recognized by the award, in November, 1945, of the 1944 Nobel Peace Prize for its work among prisoners of war. The Red Cross was similarly recognized in 1917 during the First World War.

The great nerve-centre of a widespread, complex body, the International Committee of the Red Cross acts as a gigantic switchboard to and from which flow all the calls of the National Red Cross Societies in time of war.

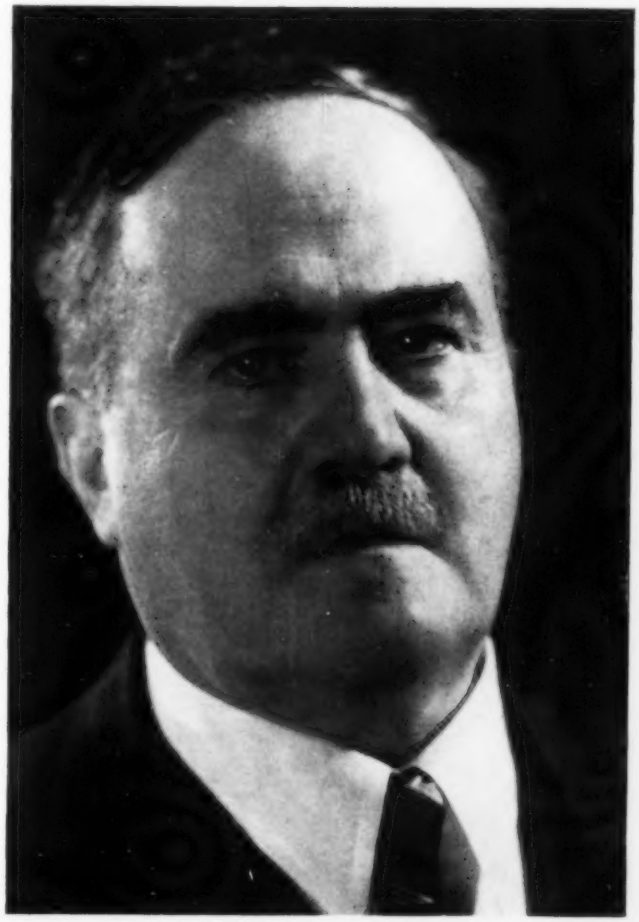
Located in Geneva, that small peaceful island in the seas of war, and formed entirely of Swiss citizens, it has the unique privilege, owing to its neutrality, of dealing with all belligerents for the benefit of humanity.

These Swiss citizens, never numbering more than twenty-five, are outstanding men who regard appointment to the Committee as one of the highest honours their countrymen can bestow on them. They are all volunteers, serving without any remuneration.

The International Committee is the body which most people associate with the name, International Red Cross, because it is this organization which functions so actively in time of war on behalf of prisoners of war and civil internees.

The International Red Cross organization itself, of which the Committee is a part, co-ordinates Red Cross effort throughout the world in peace and in war. It comprises, first, the National Red Cross Societies, of which the Canadian Red Cross is one; second, the International Committee; and third, the League of Red Cross Societies.

At the International Red Cross Conference, which is the supreme Assembly, and which, in principle, meets every four years in peacetime, but not during war, delegates from these various bodies pass resolutions on all questions concerning Red Cross policy in the international field. It never trespasses



Dr. Max Huber, Acting President of the International Committee, Professor of International Law and former President of the International Court of Justice at the Hague, who has been closely connected with the organization and work of the Committee for nearly 26 years.

The Palais Electoral was turned over to the International Committee at the opening of hostilities by the Council of State of the Canton of Geneva. This is only one of several buildings used by the Committee.

on the national activities of Red Cross Societies, who thus maintain their entire independence.

The International Committee is almost as old as the idea in the head of that young Genevan humanitarian, Henri Dunant. It was on the battlefield of Solferino in Italy in 1859 that the Red Cross idea was born in Dunant's brain. His proposals for the relief of the wounded were considered at the International Conference in 1863, arranged by the Geneva Committee of Public Utility. And it was at the International Congress in 1864, when the Treaty of Geneva was drafted, that the International Committee first began to function, being created to give direction internationally to the provisions of that Treaty, which—bearing the signatures of the original sixteen nations who agreed to it in 1864, as well as the forty-seven others who have been added since—remains in its custody.

The Committee's function consists of seeing that all units operating under the emblem of the Red Cross constantly observe the principles of humanity and neutrality. It promotes development of and respect for humanitarian conventions, such as the Geneva Convention to Ameliorate the Condition of the Wounded and Sick in the Armies of the Field (revised in 1929), and the 1929 Convention Relating to the Treatment of Prisoners of War.

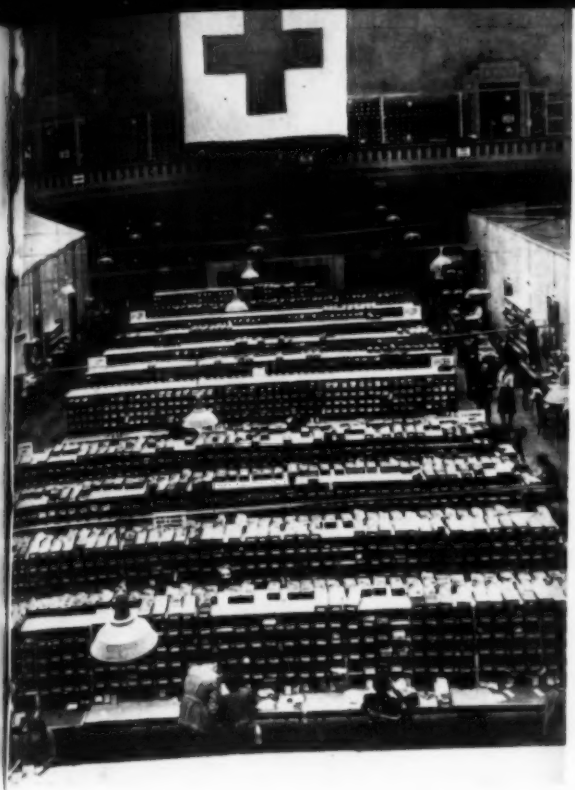
It sets up international agencies in wartime to aid prisoners of war, refugees and other war victims. Through this medium, parcels of food, clothing, medical supplies, etc., are transmitted to prisoners of war in all belligerent countries; prison camps are regularly visited by their own inspectors who see that the prisoners are being cared for in accordance with terms of the Conventions mentioned; a vast card index system is maintained covering all prisoners of war, and communication is arranged between prisoners and their families; arrangements are also made between belligerent countries for the exchange of seriously wounded prisoners.

Although the Committee itself has only twenty-five members, 4,000 to 5,000 collaborators have been working during the war—a large proportion of them serving without pay.

There is a vast amount of correspondence to be dealt with; it was not unusual for Geneva to handle in excess of one million incoming and 900,000 outgoing messages in one month, of which some 2,000 to 3,000 would be cable enquiries. During the war, the Committee's workers shipped over 40,000,000 items, consisting of cases, bags, parcels, etc., to prisoners of war and civilian internees. They have made some 25,000,000 index cards of prisoners, internees and civilians, all carefully classified according to nationality, sex, status, etc.

Canadian Red Cross Enquiry Bureaux in Ottawa and London, England, were in almost daily contact with them during the whole six years of war, obtaining information concerning prisoners of war and civilian internees requested by their relatives and friends.

Prisoner-of-war camps in all those countries which are signatories to the Geneva



Main room of the Central Information Bureau for Prisoners of War at Geneva, where are filed details regarding all prisoners of war. More than 25,000,000 index cards were made during the war. Most of the complicated work entailed is done by volunteers.

(New York Times photo)

Convention were visited regularly by the Delegates of the Committee. They inspected the camps, conferred with spokesmen for the prisoners and took note of the needs for the physical and intellectual welfare of the camp community. Very often they interviewed individual prisoners, attending to personal requests.

Detailed reports about the physical aspects of the camps, sanitary installments, typical menus, information about study courses, athletic activities of the prisoners, entertainments and many other facts, were made by the Delegates.

These reports went to Geneva and were there transcribed and forwarded to the country where the camp was located and also to the governments of those countries of which the prisoners were nationals.

It was on the basis of such reports and from the British Red Cross that the Canadian Red Cross Society learned early in the war of her prisoners' need of food, sports equipment, clothing, and reading and study material.

One of the greatest needs, as is well known, was food, and the Canadian Red Cross was able to ship more than 16,000,000 food parcels for prisoners of war through the International Committee.

In spite of the "total" war waged by all belligerent nations, which engulfed women and children, as well as fighting men, in its terror, the International Committee was able to keep alive some shreds of human decency, some spark of humanity, some hope in the heart of mankind that all good had not vanished from the earth.

The Red Cross ideal is "not of colourless neutrality", as M. Carl Burckhardt, President of the Central Prisoners of War Agency and Relief Division of the Committee, said in a speech following the war. "It is that lofty, irreplaceable virtue of which all mankind and each one of us stand greatly in need—charity."

Keeping this invaluable ideal alive—in peace, no less than in war—is the task of the International Committee of the Red Cross, and, indeed, the task of every National Red Cross Society.

Across Canada this month, Branches and Divisions of the Canadian Red Cross Society are conducting membership drives in the interests of their peacetime work.

All over the world, other Red Cross Societies will be striving for the benefit and good, not of their own peoples alone, but of the citizens of the world community.

"The Red Cross ideal stands as the embodiment of the notions of worth and dignity of the human being", once wrote Max Huber, Acting President of the International Committee. "In this respect, the Red Cross transcends by far the concepts of international law and of war. In the deepest sense of the term, this ideal is the preliminary condition for any community of man."

The International Committee was in charge of forwarding thousands of personal packages from Geneva to prisoners of war. Here they were received, verified and sent on.

Central American Cloud Jungles

by VICTOR WOLFGANG VON HAGEN*

All photos by the author

JUNGLES are generally pictured as dark, mysterious lowland regions steeped in primeval ooze, fringed with stinking mangroves and drained by murky rivers amid whose pallid whisperings lurk eels and alligators. Picture, then, a jungle which, to the contrary, is not in the lowlands but in the skies, where the water plunges down in silver cascades, where there are neither eels nor alligators, but where there are orchids, mosses, tree ferns, brilliantly coloured birds and enormous butterflies. These jungles are all the more remarkable, all the more alluring and mysterious, in that they are cloud jungles which thrust their verdure-covered heads 6,000 feet into the air—so high that they become nesting places for the heavy white masses of Caribbean clouds.

I saw my first cloud jungle in Honduras when I was in search of the famed long-tailed, golden-green quetzal bird. Honduras had first disappointed me in its appearance, since I had thought of it as a tropical country. Not until I had ridden through pine and oak trees for days on end, only occasionally dipping down into warm verdure-splashed valleys, did I really understand: three-quarters of Honduras (lying between Guatemala to the north and Nicaragua to the south) was 3,000 feet above sea-level, and three-quarters of it was composed principally of pine and oak. Yet there are many

At top:—Honduras—"land of great depths". In giant waves the mountains roll, as the sea, forming a series of cloud-topped jungle-filled cordilleras. Altitude here is approximately 5,000 feet.

*See also "Unknown Honduras" by Christine Inez Von Hagen, C.G.J., April, 1940.

This landscape (altitude 6,000 feet) gives eloquent evidence of the scenic beauty of Honduras. The cloud jungles, rising above pine and oak forests, are bathed daily by heavy moisture-laden clouds, and have luxuriant flora.

tall peaks in Honduras, and endless waves of *montañas* which, from a distance, appear to be the grey waves of the sea rolling on in endless undulations. And that is precisely what impressed the first Spanish explorers, since they called this country Honduras—meaning "land of great depths".

When riding through the sparse acacia underbrush beneath the pines and oaks, you might believe yourself in the pine sections of Mississippi—until you begin to mount the sides of the high peaks; then you know that you are in the tropics.

I climbed to the cloud forest with Chon, who could have been any one of the Central American *ladinos*. His skin was mahogany-coloured. His dark eyes, full of suppressed humour, had a slight mongoloid tilt that suggested he was part Indian. His clothes were coarse white pajama-like affairs, topped with a straw hat on which was emblazoned in woven straw a riotous red and green butterfly. He was sandalled in leather *alparagatas*, and in his hand he carried the inevitable machete. Chon was an agriculturist, growing corn, beans, coffee and cane (which is made into hard dark blocks of brown sugar called *panela*). He also knew the rain forest of the Sierra de Pijol that rose out of the pine valley of Subirana in Central Honduras. For in that forest he gathered palm leaves as thatch for his mud-block adobe home, and in the cloud jungles he hunted or else gathered the sticky sap of the liquidambar tree or the sharp-pronged vines of the Sarsaparilla.

Chon set the pace. He walked slowly up the winding path swinging idly at hanging vines with his sharp-edged machete. I followed after him, clasping my hands behind my back like an ice-skater. By pacing myself I would not put too great a strain on my heart. Already—even when the pines began to appear, draped in long veils of grey moss—my heart was beating like a trip hammer. The grey-green moss-like Tillandsia

hung down as low as ten feet, giving the forest a strange venerable aspect. The pines began to disappear at 4,000 feet and the white ghostly stems of the Cecropia began to ease in as the soil became dark and heavy and padded with humus. When we broke into the cloud level the sun disappeared. The blanketing masses of forest are bathed in fog and mist the year around and, in consequence of a ceaseless precipitation of rain and mist, there are developed in riotous succession hosts of moisture-loving plants, both on the ground and on the epiphyte-covered trees. From this section upward the jungles became suddenly thick.

Immense cedars, noble oaks, gums and Sapotas formed an almost impassable phalanx of verdure. It was like some matted wilderness buried in immense gloom. Wild fig trees, called *matopalos* (tree killers) embraced other trees and encircled them with crushing vine-tentacles, and, using their hosts for support, their topmost branches sought the sun. Giant trees rose upward carrying parasites, mosses and ferns and snake-like Lianas that twisted about the trees in the manner that the serpents embraced Laocoon and his sons.

Rarely photographed, the quetzal, sacred bird of the Mayans and Aztecs, is a denizen of the Honduras rain forests. This brilliant golden-green trogon (of the same family) has a tail thirty inches long.

There is no winter in this forest. The greens are eternal. Unknown here are the purple, brown and golden autumnal tints; its greens never fade into chiaroscuro. Although the climate is often chilly, sometimes near to freezing, the cold sleep of winter is unknown, as well as the lovely awakening of the first gentle touch of spring.

Trees—immense trees, which the arms of eight men could not girdle—shot up into the sky where the crown of green disappeared into the low-lying clouds. Here were giant mulberries and the Morus, with greatly elongated, but inedible, fruits. Drimys, a relative of the magnolias, with its glaucous leaves and pungent bark, filled the dank morning air with a sweet scent. Immense roots of unseen trees supported their lofty trunks with roots like the flying buttresses of Gothic cathedrals. Big trees crowded out the little ones; parasites and orchids clung to the limbs. Vines, as thick as my wrist, wound up the trunks of most and stretched from tree to tree, binding the cloud jungle

Perched on a tree platform, the author seeks to "capture" with his camera the elusive quetzal in flight.

together like the woof of a carpet. Out of this mass of lichen-covered trunks swathed in epiphytic clusters I made out only one tree which I could instantly recognize—the liquidambar. These large-trunked trees with leaves shaped like maples are tapped by the *ladinos*, just as one might tap a maple for its sugar or a pine for its rosin. The liquidambar yields a yellowish fragrant balsamic liquid which exudes from its trunk when this is properly cut. It is the only commercial reality—*gracias a Dios*—in the whole rain forest.

I followed my guide over the thin ribbon of a trail, slipping, sliding and falling into the liquid mud of this eternally moist world. Chon had taken off his sandals. His broad spreading feet planted firmly in the thick mud kept him upright. I, in my boots, found it less easy to walk.

The higher we climbed, the deeper we penetrated into the forest, the thicker became the jungle. The multiplicity of the plant-forms was bewildering. The trees did not grow in clusters like sycamores, pines and oaks; each tree here seemed to be different. And here a point of nature was brought home to me: the more untouched by man, the richer in variety is Nature. Multiplicity of form is her essential characteristic; uniformity, that of man.

At times the jungle is suddenly blotted out by blankets of heavy white clouds that settle down on the forest. This whole atmosphere remains at a constant saturation point. Rain hangs like unshed tears. The equipoise between mist and rain is so delicate that anything—a falling tree, the slightest change in the barometric pressure—is enough to cause rain. The mist seems always to be falling and a temperature of 58 degrees at midday does nothing to remind one of the tropics, despite the bewildering tropical verdure.

Water tinkles and plops ceaselessly. Everything oozes. Every branch and trunk is swathed with epiphytic growths. The sodden earth is covered with a deep mulch of leaves, and everywhere I stepped there were mosses and lichens which peeped out from

The cloud forest is filled with dripping water. Forming into rills and waterfalls, the whole becomes a mass of running, plunging water. The author's wife is standing beside a miniature waterfall.

the fallen leaves. All were as saturated as wetted sponges. The ground is never dry. These infinitesimal drippings grow into trickling rills that gush into streams and these cascade down from the cloud forest to the arid plains below.

Cloud jungles such as these are distributed on many ranges from Mexico southward through Guatemala and Honduras, down into Panama. Wherever the requisite conditions of altitude, climate, humidity (with saturation and coolness) prevail, and wherever these verdure-crowned mountains receive the genial moisture-giving rain clouds of the Caribbean—there will be found the cloud jungles. It is almost paradoxical that rising out of the arid pine and oak regions (where there is scarcely a foot of rain a year)

Natives build a lean-to for the explorers so that they can take refuge at night from the cold and rain of the cloud-swept sky jungles.

will be the cloud-forested area, where precipitation will exceed 200 inches yearly.

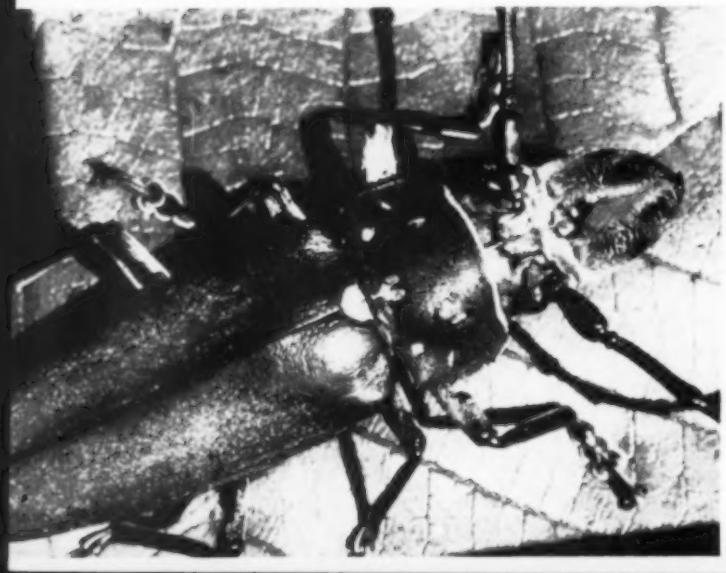
What remains unsolved is the distribution of life in these cloud jungles which continue uninterrupted for miles, carrying the same plant and animal life, which is unique with them. They will be separated by hundreds of miles from other similar ecological zones, yet all will have identical floral and faunal forms.

The chirping of the brown tree-frogs gave out a sound as if hundreds of hammers were violently striking an empty cask. Cicadas filled the jungles with a vibrant clatter until you could fancy yourself in a factory of buzzsaws. Large blue morphos (butterflies) fluttered easily between the labyrinth of trees while long-winged giant dragon-flies rose like helicopters to the higher reaches of the forest.

Birds were everywhere. Toucans with their ridiculous beaks bent down to peer at Chon and me, breakers of the jungle peace, and then fly noisily away. Woodpeckers sank their pneumatic drills into the dead trees while the motmots, who purposely nibbled away their tails until they were racquet-shaped, dove and spun in mid-air, reflecting the madness of their mood; for it was the mating season.

Trogons, cotingas, ant-birds, motmots and all the other avian inhabitants of these regions remain within fixed altitudinal bounds. Few voluntarily leave them. There are certain numbers of birds that perform seasonal altitudinal migrations, yet all remain in the rain forest.

Immense beetles, whose larvae are buried in trees, infest the cloud jungles and make them vibrate with the noise of their flying in the "dry season".



Below:—Fierce mandibles form "pincers of protection" for these brilliantly coloured beetles.

The howling monkeys barked and screamed until one would have believed that a troop of mad lions had possession of the Central American tree-tops. These, with the white-headed capuchins (the organ-grinder's monkey) are the only simian inhabitants of the rain forests. But there are other mammals: sloths, anteaters, porcupines and an occasional jaguar.

Insects were the guardians of the ground. Long, black, solid lines of driver ants combed the lower forests in compact masses of ferocious soldiery, searching out, hunting out every known insect dweller. Cockchafers, grasshoppers, spiders, moved in mad flight before the onrushing blind avaricious eciton ants, fully an inch in length, armed with rapacious stings and sickle-shaped mandibles.

The umbrella ants (frugivorous where the eciton is carnivorous, red where the other is black) also move through rain and sunshine along ant-highways which they have made and over which they carry bits of cut leaves. These are taken below to their catacombs to fertilize their fungus gardens. Butterflies are everywhere, lending a chromatic splendour to these rain-soaked jungles. We broke into a mass of drifting yellow and white callidryas and into the encircling bouquets of red and black papilos. As we burst into them, they rose like a fountain of flowers and then, like iridescent confetti, drifted down about our shoulders.

But it is the variety and colour of birds that give life to the cloud forest. There is the sad-voiced tinamou, the piercing dulcet song of the little brown hilgero and the "wacawaca" of the laughing guaco-hawk. Humming-birds dart in and out among the tree ferns or pause, suspended by droning wings in mid-air. Cotingas, their white heads looking like unsmirched snow, fill the forest

Top right:—
The three-toed sloth finds the forest a place for concealment, since moss grows on its fur and completely transforms it.

Bottom right:—
A green tree-frog takes on the colour of its host-leaf as it finds refuge from the ceaseless dripping of the night rains.

A Bromeliacious; this light-loving aerial plant is found, with orchids, clinging to the lifeless branches of jungle trees.

with their distinguishing note — "clang-dang"—with all the resonance of a clapped bell. But above all these is the apotheosis of the rain forest—the quetzal.

For here, among all the rain and fog, the most beautiful bird in the world makes its home, laying its two blue eggs in the hollowed-out boles of dead trees in woodpecker fashion. It was for a glimpse of this bird that I had dragged Chon to the rain forest. Above the bleat of the paterfamilias of a troop of howling monkeys, I heard it singing. Like the fluted song of the hilgero it fitted the gloom of the rain forest. For birds always utter the mood of the landscape, and each part of the earth has precisely the bird voices that are in tune with it. That of the quetzal had a melancholic quality. The natives, too, have caught its pathos, for the trogons of the same family are called *viudas* (widows) because of the wounded cry they give.

Low and throbbing, the quetzal song began; then it became rhapsodical as the male answered in antiphonal fashion. Next, there was a flash of emerald green, and a bird of dazzling red and golden-green broke into the open, fluttered convulsively while dragging its long green tail plumes behind, and came to rest on a low branch. Its splendour was so unreal that neither photographs nor word-descriptions can even begin to etch the picture of the most beautiful bird in the world.

It is not large. The quetzal would hardly outdo in size a pouter pigeon, yet in colour and beauty it seems to have surpassed all the denizens of the bird world. The translucent green of its plumage covers its back and laps over its jet-black wings in the form of lanceolate-shaped green coverts. The same golden-green feathers compose an upstanding crest and continue downwards on to the breast, forming a solid green shield. From there on, without prelude, is a breast of such startling red that it seems like blood hemorrhaging from a deep wound.

The glory of the quetzal is, however, its long tail. The actual tail is black and white,

A thick-leafed muyuyu *plant growing in the moist soil of the cloud jungle.*

but cascading from its back is a series of green feathers, each longer than the first and culminating in a super-tail, with tail-plumes fully forty inches in length. These were the long golden-green plumes that Aztec priests placed in their fantastic head-dresses, and these were the ones that adorned Moctezuma's crown.

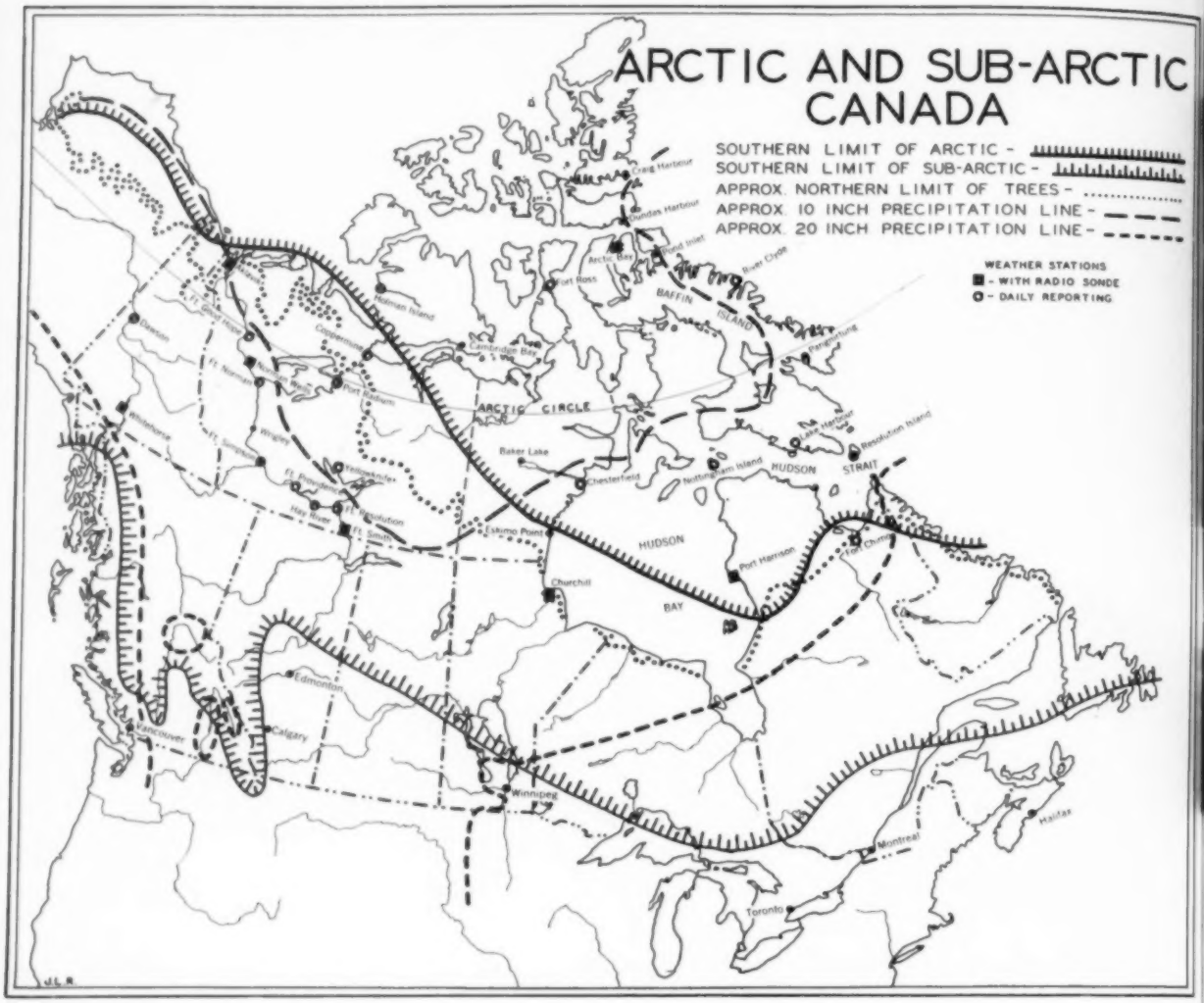
We sat, Chon and I, admiring this quetzal, unmindful at first of the steady drip, drip, drip of the water. The clouds—for it now was afternoon—were being forced down to "sleep", as Chon insisted, on the *montaña*. Wisps of moisture-laden clouds drifted by and the drip, drip increased. The quetzal, itself seemed unmindful of us. It sat heavily on a dead branch, quite immovable. The only indication of its being alive was the low metronomic cluck that convulsed its body, each note being accompanied by a flick of its rapier-long tail.

Then the spectacle ended. A heavy cloud slowly descended in front of us like a drop curtain, obscuring the forest and making it as opaque as a Golden-Gate fog. We arose, soaked to the skin, and groped our way back to the small yellow trail. It was actually no longer a trail, but a flowing brook. The cloud forest was rapidly becoming the rain forest. The birds stopped singing and retired to some dry cranny. Butterflies made off hurriedly to take refuge under broad leaves. The immense trees became indistinct shadows on a jungle back-drop.

Above the dripping, splashing, and plopping of the rain there was but one sound—the clamour of the howling monkeys,who seemed, even in the downpour, to be the guardian hosts of this most alluring and mysterious forest in the world—the cloud jungle of Central America.

Top right:—High up, above the clouds in the rain forests of Honduras, giant tropical tree-ferns grow in bewildering profusion.

Bottom right:—The trees are loaded down with clinging epiphytes. Orchids hang from the tree-tops and fill the cloud forests with rare scents. There is scarcely a square inch of bark that does not play host to thousands of parasites.



*Weather and Climate of the Northwest Territories**

by J. LEWIS ROBINSON**

Photos by the author unless otherwise credited.

NORTHERN CANADA is a bleak land of frozen wastes and barren rocky hills—it is a land of extensive green forests and a great variety of colourful flowers. Northern Canada has recorded some of the coldest temperatures known in North America—it has had hot summer days during which temperatures of almost 100° F. promoted rapid growth. These statements, although seemingly contradictory, are nevertheless true, but only partially describe the climate of the vast Northwest Territories. Optimists stress the warm temperatures and long summer days, while pessimists point to the long cold winter, lack of precipitation, and frequent summer frosts.

The individual is apt to become confused when these various facts are thrust upon him without adequate explanation. He often wonders, "How cold is it?" or "Is there really a summer in the Arctic?". When the United States Army Engineers arrived at Fort Smith on the southern boundary of the Territories, in 1942, they asked, in all

*Prepared at the Bureau of Northwest Territories and Yukon Affairs, Lands, Parks and Forests Branch, Dept. of Mines and Resources, Ottawa.

**The author wishes to acknowledge the assistance of A. J. Connor, Climatologist with the Meteorological Service, Dept. of Transport, Toronto.

At top:—Meteorological station at the airfield at Hay River, Northwest Territories

Above:—Ionosphere research station and United States weather station (right) at River Clyde, Baffin Island

Photo by P. D. Baird

seriousness, how close they were to the North Pole. When they were informed that the North Pole was as far north of them as Los Angeles was south, they felt sure that these Canadians had never seen a map. Such false impressions are not restricted solely to people outside Canada, for many Canadians, too, have hazy ideas as to the climate of their country's northern regions.

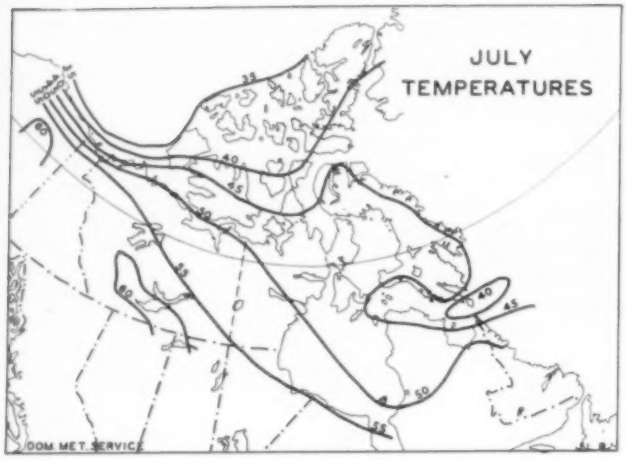
In order to obtain authentic information regarding climatic conditions in northern Canada, the Canadian Meteorological Service, Department of Transport, and Royal Canadian Corps of Signals have established meteorological stations throughout our Northland. Many of these stations, consisting of lonely groups of buildings far from other white settlements, are serviced but once a year by ice-breaker. Their scattered locations are necessary in order that daily

Above:—Settlement of Fort Providence, Northwest Territories — the Royal Canadian Corps of Signals meteorological station is in the lower right corner.

Right:—Husky dog in Mackenzie Valley; he is the dependable means of winter transportation between the various settlements.

Right:—Arctic Bay in winter—Canada's most northerly meteorological station

Dept. of Transport photo



atmospheric conditions may be measured and this information transmitted by radio to the more southerly stations. Since the weather in central North America moves from west to east, and is caused partially by the interplay of air masses from northern Canada and the Pacific Ocean, weather prediction (e.g., frost danger and precipitation) is strengthened by data regarding northern air mass movements and their characteristics. Nearly all transportation in the Northwest Territories, whether by plane, boat or dog-team, is largely dependent upon weather conditions, and the trust which transport officers place in the weather prediction of their northern stations is a just tribute to the valuable work which these men perform.

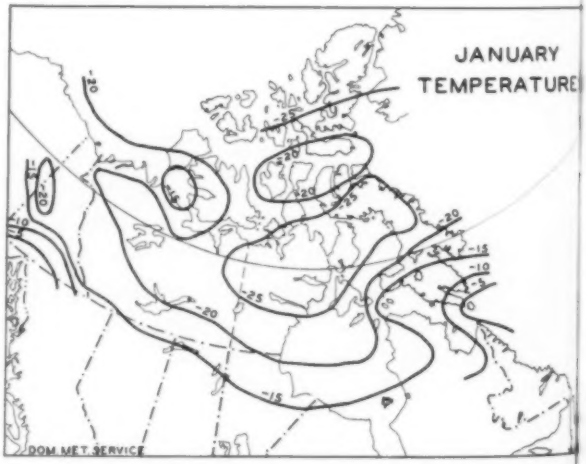
Climatic Regions

Since the Northwest Territories are so vast, temperatures vary greatly from place to place within the same season. This difference is marked enough each year to enable the area to be separated into two major climatic regions.(1) The northeastern region, including all the islands of the Arctic Archipelago, has a true Arctic climate, as defined by climatologists. The region north of a line extending roughly from the mouth of the Mackenzie River to Churchill, Manitoba, on Hudson Bay, is characterized by a climate in which the average temperature of the warmest month is *less* than 50°, but more than 32°.* Average winter monthly temperatures are all *below* 32°. The remainder of the Northwest Territories and Yukon has a sub-Arctic climate, in which the average temperatures of the coldest months are *below* 32°, but average temperatures of the three summer months are *above* 50°. Thus, the chief distinction between these two climatic regions is not in the winter, when both are cold, but in the summer, when the western areas are much warmer. (See map of July temperatures.)

The accompanying climatic map shows that the Arctic areas of Canada extend far south of the Arctic Circle (the incorrect limit of the Arctic in the popular conception), and Arctic conditions prevail as far south as latitude 57 degrees on the Hudson Bay coast of northern Quebec, and latitude 61 degrees on the west coast of the Bay in Keewatin District. Conversely, the sub-Arctic climate of northwestern Canada extends as far north as Aklavik, latitude 68 degrees, about 110 miles north of the Arctic Circle.(2) The climate of the Canadian Northwest is, therefore, similar to that which is found in Ontario north of Lake Superior and in Quebec north of the Gulf of St. Lawrence.

Climatic Controls

In order to understand the reason for climatic differences one has to be familiar with the various climatic controls that determine what type of weather may appear over a region. This is the work of the climatologist, who studies the kinds of air masses

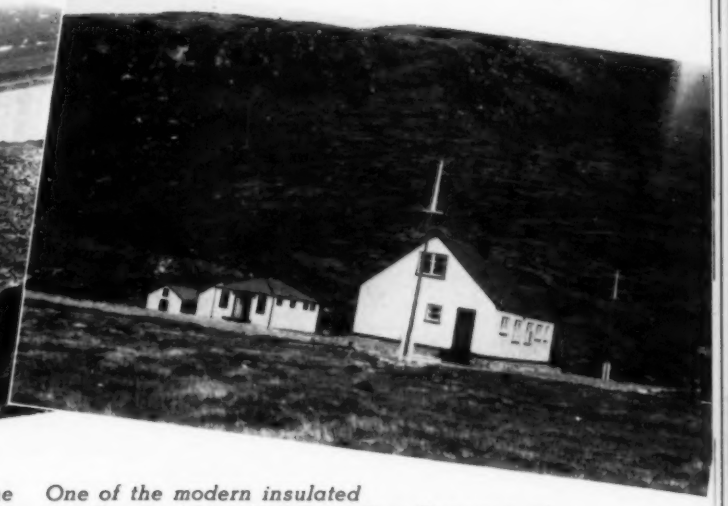


*All temperature readings throughout this article are given in Fahrenheit degrees.

(1) *The Northwest Territories—Administration, Resources and Development*, Bureau of Northwest Territories and Yukon Affairs, Dept. of Mines and Resources, Ottawa, 1944 (p. 12)

(2) "Land Use Possibilities in Mackenzie District, Northwest Territories", *Canadian Geographical Journal*, July, 1945 (p. 35)

Eskimo summer tents on the rocky beach at Cape Dorset, Baffin Island. Daily summer temperatures range from 50° to 60° here.



One of the modern insulated dwellings of the Hudson's Bay Company at Sugluk, on Hudson Strait. These homes are excellently furnished and usually heated with coal brought in on the annual supply ship.

which move over or near the area concerned, considers such geographic factors as latitude, topography, and distribution of water bodies, which influence the atmosphere, and averages the day-by-day weather records over a period of time to present a generalized picture of the usual weather conditions.

The layman may feel that this is too complicated for him to follow, but actually the weather and climate of a region result from known climatic controls. The usual weather is caused by the commonly occurring air masses which pass over the area, while the possible changes are limited by the types of air which *may* reach the region. Once the source regions and usual paths of the air masses are known, weather observers have only to record the air-mass properties and plot their movements on weather maps.

Modern meteorology is founded on the concept of air masses.[3] An air mass is defined as a huge body of air (from 100 to 500 miles in diameter) whose physical properties at its source (notably temperature and humidity) are more or less uniform horizontally. Regions of the earth where air masses stagnate long enough to gain definite properties are known as source regions. From time to time air masses which form in northern source regions move southward and join the generally eastward movement of air in mid-latitudes. They move across southern Canada and northern United States, being modified rapidly in summer and more slowly in winter by contact with the land. The kinds of weather occurring along the way will be partially due to the type of air mass and its degree of modification. In general terms, a cold dry air mass brings cool, dry, sunny weather, and a warm moist air mass is characterized by moderate, and usually cloudy, weather. At the boundaries between air masses of different types rainy or snowy weather is common.

Northern Canada is influenced by air masses from five chief source regions, and the seasonal properties of these air masses largely determine the type of climate.

	Source Characteristics	
Source Region	*Winter*	*Summer*
Arctic Ocean West	Very dry, cold	Dry, cool
Arctic Ocean East	Slightly moist, cold	Slightly moist, cool
Bering Sea	Lower layers moist, moderate cold	Moist, cool
North Pacific Ocean	Lower layers quite moist, mild	Moister than in winter Cooler than air over continent
North Atlantic	Moist, cool	Moist, cool

(Polar air which has left North America and returns as an easterly wind)

Cold air from the Arctic Ocean moves southward over continental Canada, being unhindered by topographic barriers, and is commonly found along the surface at all seasons. Air from other sources will generally be found aloft over the Territories,

(3) *Meteorology of the Canadian Arctic*, Dept. of Transport, Meteorological Division, Toronto, 1944

advancing eastward above the heavier continental air, and in these cases mountain barriers will prevent the moist lower layers of North Pacific and Bering Sea air from reaching the Territories. When the continental air (which originally came from the Arctic Ocean) moves eastward rapidly, there may be an opportunity for the drier top layers of Pacific air to descend to the surface of northwestern Canada, causing a sharp rise in temperature. At all seasons, polar air which has been warmed over the continent may return northward on the westward side of a circulatory wind system, bringing comparatively moist and warm air into the Northwest.

Depending upon how dominant are the Arctic air masses, the winters of the Northwest will be moderately cold or extremely cold, and will vary from year to year. For example, Fort Good Hope had an average mean monthly temperature for February, 1925, of –33°, while February, 1920, averaged above zero.(4) Similarly, Dawson City, Yukon, averaged lower than –43° during January, 1909, and yet recorded an average mean monthly temperature of +7° in January, 1926. Thus, northwestern Canada can be as cold in winter as the coldest parts of northeastern Siberia, or as mild as the Upper Ottawa River Valley.*

During mid-winter the Eastern Arctic is under the influence of polar air masses which move almost continuously southeastward from the Arctic Ocean towards Manitoba and James Bay. Relatively warmer air masses occasionally swing northwestward from the Labrador Coast to southeastern Baffin Island, but the Eastern Arctic is too far east to be influenced by warm Pacific air. Thus, one of the factors making the Eastern Arctic differ climatically from other parts of Canada is the continuity of cold periods. An extreme example was recorded in 1923-24 at Pond Inlet, Baffin Island, when the temperature remained continually below zero for 85 days, and for 28 days of that period the temperature fell to –40° or lower at some time during each day.

The Eastern Arctic has a large amount of cold water, including vast Hudson Bay, within its boundaries, and this is an important factor causing its summer climate to differ from that of the northwestern region.(5) In addition, the general movements of ocean currents through the Arctic Islands is eastward from the Arctic Ocean and southward towards Labrador, so that

(4) Connor, A. J., "The Temperature and Precipitation of Northern Canada", *Canada Year Book*, 1930 (p. 47)
(5) "Physical Geography of the Canadian Eastern Arctic", *Canada Year Book*, 1945 (p. 12)

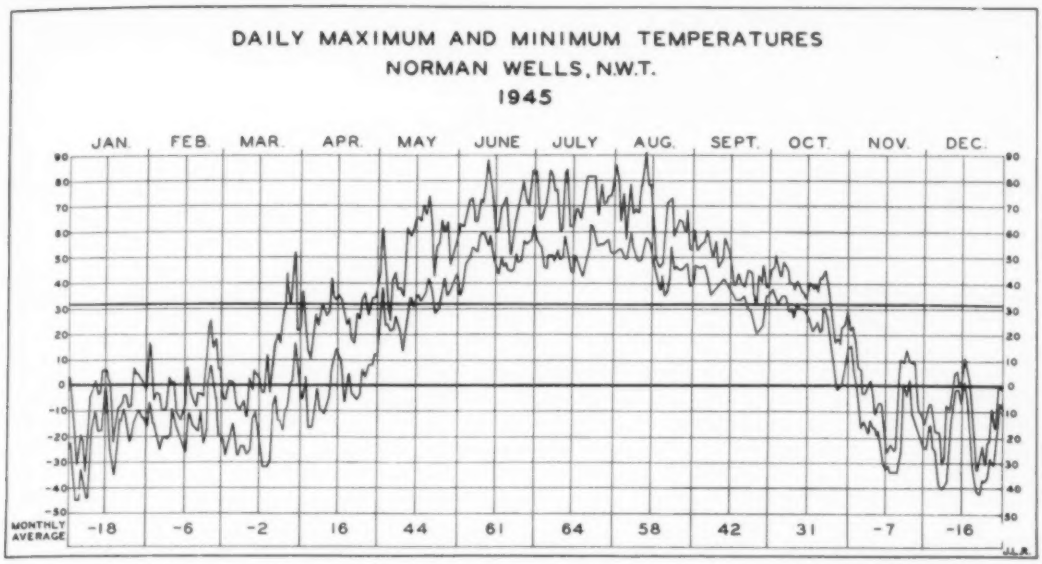
*At the stations of the Dominion Meteorological Service the highest and lowest temperature in each 24 hours, termed respectively the maximum and minimum, are recorded by self-registering thermometers. For any month the sum of the daily maxima, divided by the number of days of the month, is the mean daily maximum temperature of that month. The mean minimum temperature is obtained in a similar manner. The half-sum of the mean maximum and the mean minimum is called the mean monthly temperature. The averages of these results for any particular month over a period of years are the average mean monthly temperatures.

The highest and lowest temperatures during the total number of years of recording are termed the extreme maximum and extreme minimum. The latter figures are, of course, not usual, and differ from the average monthly maximum (or minimum), which is obtained by averaging the sum of each monthly extreme maximum (or minimum) for a particular month over a period of years.

Bottom left:—The barren, rocky interior of southern Baffin Island. No agriculture is possible in this area. Patches of snow still remain in mid-July.

Below:—Ice-floes delay summer transportation in Hudson Strait. Massed floes block Wolstenholme harbour in mid-July, and annual supplies must be landed at a later second call.

Photo by F. Sparks


DAILY MAXIMUM AND MINIMUM TEMPERATURES
NORMAN WELLS, N.W.T.
1945
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
MONTHLY AVERAGE
-18 -6 -2 16 44 61 64 58 42 31 -7 -16

The graph of daily maximum and minimum temperatures at Norman Wells in 1945 illustrates the variations in temperature which may occur within a month. For example, although March had a monthly average of —2°, a temperature of over 50° was recorded in the month. The periodic movement of warm air masses over the region is graphically shown by the peaks recording high temperatures.

the waters are kept continually cold, hovering around 32° in Hudson Strait during the summer. Most students have performed the experiment which proves that soil loses temperature more rapidly than does water and that, similarly, its temperature rises faster. Continental land masses react in the same manner by cooling off rapidly in winter and heating up rapidly in summer, while land masses near large water bodies do not become as cold nor heat up as rapidly.

Winter Temperatures

As a result of its interior continental location, the lowest minimum temperature in Canada has been recorded at Fort Good Hope, in Mackenzie District. This temperature was –79°. Temperatures lower than –70° have been known north of Edmonton, Alberta, and Prince Albert, Saskatchewan. Extreme minimum temperatures of –67° have been recorded at three Yukon stations, and –65° has occurred in northwestern United States. There are probably colder places in the Yukon Mountains or on the Canadian Shield between Great Bear Lake and Hudson Bay, but no weather stations have been maintained there. Compared with these figures, the record low of –60° at Pond Inlet, Baffin Island, and Chesterfield, Keewatin District, belies the popular reputation of the Eastern Arctic as having the coldest temperatures in Canada. At other Eastern Arctic posts the lowest temperatures recorded are about –50°.(6)

Although extreme minimum temperatures in the Eastern Arctic are not as low as those of the interior area of northwestern Canada, it is, in reality, the coldest part of Canada on a monthly average. Winter begins in late September and lasts a full eight months. For three or four months of this time mean monthly temperatures range from –20° to –30° at the northern Eastern Arctic posts, and February is generally the coldest month. In the Hudson Bay and Hudson Strait area monthly averages vary from 0° to –20° for four months of the winter (10 to 20 degrees *warmer* than the same latitude in the Mackenzie Valley), illustrating the moderating effect of the relatively warmer air masses from the North Atlantic. (See map of January temperatures.)

In the Mackenzie Valley, January is the coldest month and monthly winter temperatures have an average of –15° to –23°.

(6) *An Outline of the Canadian Eastern Arctic. Its Geography, Peoples and Problems*, Bureau of Northwest Territories and Yukon Affairs, Dept. of Mines and Resources, Ottawa, 1944 (p. 8)

(Ottawa has a January mean of +15°.) These figures show that over a long period of time the region is much colder than the January mean average of –3° in Winnipeg, Manitoba, where mild spells raise average temperatures. Chinook thaws occasionally occur east of the Mackenzie Mountains but are not common. In such cases, air descending from the mountains heats rapidly, and at Aklavik on December 6, 1928, for example, the temperature rose from –5° to +54° within six hours.[7]

Although winter temperatures are undoubtedly cold in the Northwest Territories, man is combating his environment by utilizing scientific principles of heating. Modern houses for permanent residents of the area are soundly built and well insulated to withstand the severest cold. The mining companies provide comfortable heated dwellings with hot and cold running water for all their employees, and usually have a variety of indoor recreational facilities. In the Mackenzie Valley, in particular, ample fuel oil from near-by Norman Wells is a cheap source of efficient heat. Truly, the modern resident of the Territories no longer suffers the hardships from cold which were braved by early pioneers—he is warm when inside, and when outside about his duties he, unlike the people of our city civilization, is dressed suitably and warmly.

Despite our pride in technological advances in winter dwellings and clothing, we have to bow to the intelligence of the hardy Eskimo who, centuries ago, learned the principle that a closed dome of snow-blocks with an interior raised platform and low openings for ventilation was the most efficient method of heating with very little fuel. The Eskimo also learned that the warmest clothing came from the hides of the animals of the same environment, and modern residents of the Arctic still wear this type of winter clothing when travelling.

Arctic Night

Every schoolboy thinks of the Arctic as a place of six months' darkness and six months of continual daylight. Actually, the geographic North Pole is the only place which has six months with the sun below the horizon, and the length of the period of 24-hour darkness is reduced progressively southward to the Arctic Circle, where there is only one day in the year when the sun is not visible. The appeal of the "land of the midnight sun" has been caught and vividly described by an explorer on Ellesmere Island.[8]

"The period of so-called Arctic night begins on October 21 when even at noon-day the sun does not rise above the horizon in the due south. After the sun has first disappeared it lights the southern sky quite brightly for several hours each day, but this daily period of twilight rapidly shortens and grows fainter, until by mid-November only a noonday flush indicates south. Even this soon fades away and for almost two months Ellesmere Island is a land of darkness.

"This Arctic night is not so dark nor so disheartening as the imagination of temperate and tropical peoples is wont to picture it. For ten or twelve days of every month the moon circles the sky; the brilliant stars revolve around Polaris almost at the zenith, and the light from the moon and stars is reflected from the glittering snow-and-ice fields.

"Then about mid-January the soft rose and gold of the noonday flush reappears on the southern horizon and waxes longer and brighter each day until at noon on February 21 the upper limb of the sun, large and red, gleams soft and bright above the southern horizon for a few moments. The sun has come back. The long night is over. The next day the whole sun appears, and seems to roll along the horizon a few degrees for a few minutes; the next day it has risen quite above the horizon and covers an arc of several degrees; in the next few days the time and the arc lengthen fast.

"The time of sunshine lengthens each day, and night grows lighter, until on April 21 there is no sunset. The sun merely dips down to the horizon due north at midnight, and begins at once to rise to another circle a little higher than the day before. Day by day the sun rises in the sky until in mid-

(7) Koeppe, C. E., *The Canadian Climate*, Bloomington, Ill., 1931 (p. 104)

(8) Ekblaw, W. E., *The Polar Eskimo; Their Land and Life*, Clark University, Worcester, Mass., 1926

At top:—Settlement at Aklavik after an early autumn snowfall

Photo by D. B. Marsh

Above:—Department of Transport meteorological station at Coppermine on Coronation Gulf. Important weather information is transmitted daily by radio to more southerly stations for forecasting purposes. Dept. of Transport photo

Above:—Royal Canadian Corps of Signals station at Fort Norman in centre, Doctor's residence at right, scenic Bear Mountain in background

June the full glory of Arctic day floods the whole top of the world within the Arctic Circle."

Summer Temperatures

The greatest climatic difference between the Eastern Arctic and northwestern Canada appears during the summer. This difference, which is also evident in resources, development, and peoples, can be directly traced to the climatic controls which give the two regions separate characteristics.

It is generally believed that the warm summer temperatures of the Mackenzie Valley are due to the long hours of daylight.* Undoubtedly the long daily period of solar insolation helps to stimulate the growth of garden crops, but since, as shown by the following table, places of the same latitude in the Eastern Arctic (having,

Winter clothing of caribou skins worn by the Eskimo—designed to give maximum warmth and freedom of movement. River Clyde, Baffin Island. Photo by S. Hluckan

*A chart showing the number of hours of summer daylight each month at the Mackenzie Valley settlements will be found in reference(2).

therefore, an equal number of daylight hours) do not record the same warm summer temperatures, there must be other contributing factors.

July Temperatures

Latitude	*Western*		*Eastern*	
60	Fort Smith	60°	Churchill	53°
			Cape Hopes Advance	41°
65	Fort Norman	60°	Chesterfield	48°
			Pangnirtung	45°
69	Aklavik	56°	Cambridge Bay	49°
			Pond Inlet (lat. 73)	42°

There are two major reasons why summer temperatures do not rise in northeastern Canada, resulting in Arctic rather than sub-Arctic conditions there: the Eastern Arctic is dominated by cool Arctic air masses during the summer, and the area contains large bodies of cold water whose temperatures rise slowly, militating against any rapid warming of the lower layers of Arctic air.

The present Eastern Arctic stations, all located on the coast where water transport can serve them, record extreme maxima only in the 70's, and the highest known recordings are 84° at Chesterfield Inlet and 81° at Lake Harbour and Cape Hopes Advance, on Hudson Strait. It is no doubt possible that higher summer temperatures may occur in certain low interior areas. Average daily maxima in the cool 50's are the usual summer temperatures of the Eastern Arctic, where a July average mean temperature is similar to an early April mean temperature near Vancouver, British Columbia.

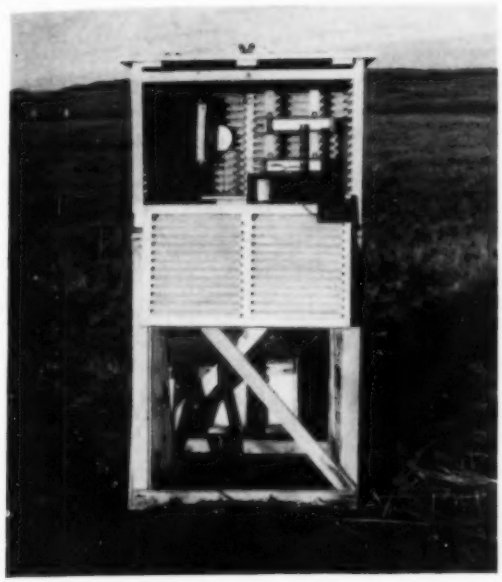
The Eastern Arctic does have a summer, however, during which the snow disappears for three or four months. Grass comes to life in the valleys and lowlands which contain soil, and flowers blossom forth in colourful beauty. Ducks and geese crowd their summer nesting grounds after long flights from the south, and myriad mosquitoes swarm over the low wet areas. In Hudson Bay and Strait the sea-ice begins to break up in late June and is joined by the ice from Foxe Basin in the general drift of currents through Hudson Strait to the North Atlantic. During much of July the Strait remains non-navigable as the ice moves outward, being hastened by westerly winds or delayed by easterly winds. Towards the end of October or early November the

Group of gardens in the Mackenzie Valley

Right:—A commercial garden at Yellowknife

Below: — Hudson's Bay Company garden at Fort McPherson, 80 miles from the Arctic Coast

Bottom right: — Anglican Mission garden at Fort McPherson. Note the greenhouse in background.



Instrument shelter where the atmosphere's phenomena are recorded at all meteorological stations. Dept. of Transport photo

sea-ice again begins to form and will build out from the shores for a distance of five to seven miles, finally reaching a mid-winter thickness of about five feet.

In the Mackenzie Valley, the land mass heats up more rapidly in spring, despite the large number of lakes, and under the influence of warm air from the North Pacific some days may become quite hot during the summer. Average daily temperatures rise above the freezing point in late April and early May. At the stations along the south shore of Great Slave Lake and near the Arctic Coast, daily spring temperatures in May and June will depend greatly upon wind direction. A south wind will bring warm weather for a few days, while a north wind from the ice-covered lake or Arctic Coast will be cold. During the period of break-up and freeze-up there is a space of about three weeks in both spring and autumn when climatic conditions limit transportation.* Planes have to change from ski to float equipment, and after break-up local dog-team travel is replaced by small boats and canoes.

During the three summer months of June, July and August average mean monthly temperatures range from 50° to 60°. Extreme maximum temperatures of 90° or more (Fort Smith 103°) have been recorded at all stations except Aklavik (88°), but monthly maximum temperatures of 80° to 85° are more usual.

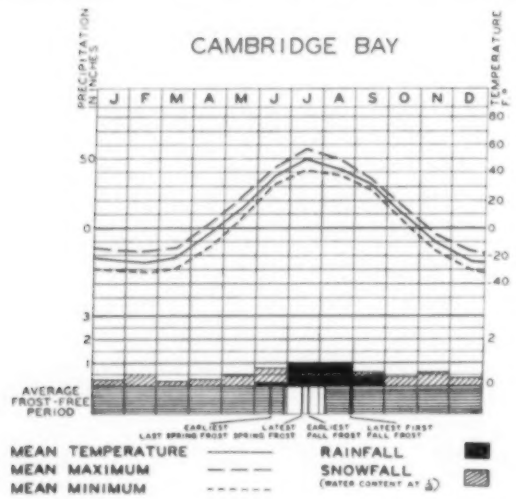
Summer in the Mackenzie Valley is really a very pleasant season. The days are warm and usually bright, and ordinary light summer clothing is customary. With daily temperatures above 70° and night temperatures above 45° in July during the growing season, it is not strange that the usual garden vegetables are raised in sufficient quantities for local use at all settlements as far north as Aklavik. In years without early frosts wheat will ripen as far north as Fort Simpson, and sometimes even beyond there.

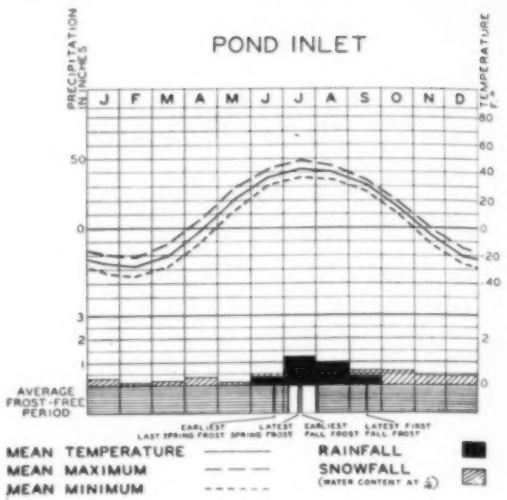
Generalizing about summers in northwestern Canada is a dangerous practice because they differ in character from year to year, depending upon the dominant movement of Arctic air masses. If these air masses follow their typical southeasterly summer course over Foxe Basin, warm Pacific air entering from the west or south will raise Mackenzie Valley temperatures, but if the cool air masses maintain a more westerly course, the season may be rather cool. Because of this occasional latter condition, July extreme minimum temperatures ranging from 26° to 31° have been recorded at nearly all Mackenzie Valley stations and August minima of 18° to 24° are known at each place.

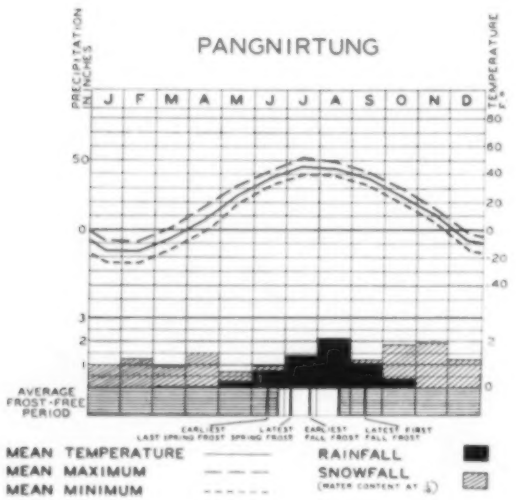
Northern Arctic Islands

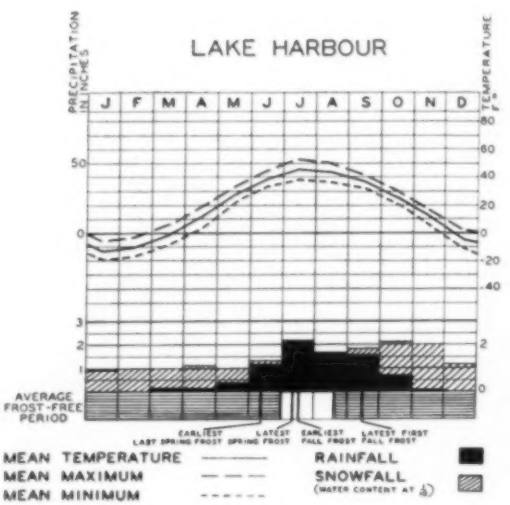
Temperatures recorded in the farthest north group of Canadian Arctic Islands, on which no one lives at present, are more typical of those which are generally, but incorrectly, attributed to all of northern Canada. Meteorological data for this area are scanty, being supplied chiefly from the R.C.M.P. detachments' and explorers' records, but they indicate that January mean temperatures average from −25° to −35° and that July monthly means seldom rise above +40°.

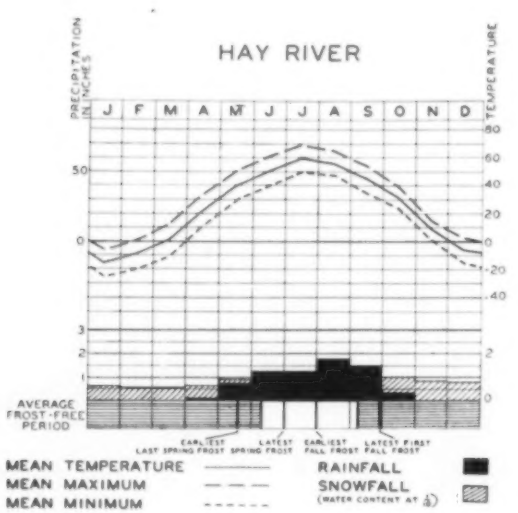
*For more detailed information on transportation see "Water Transportation in the Canadian Northwest", *Canadian Geographical Journal*, November, 1945.

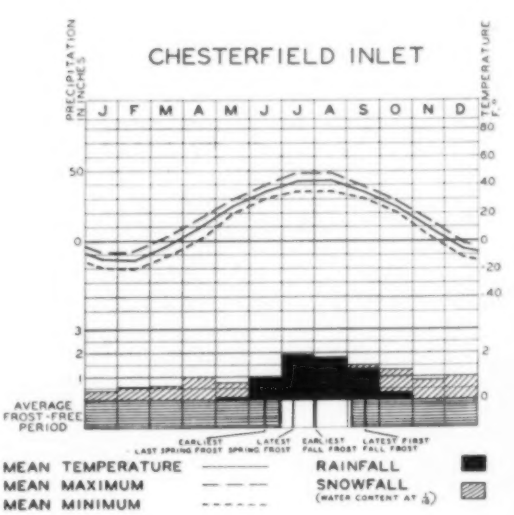

CAMBRIDGE BAY
PRECIPITATION IN INCHES
TEMPERATURE F°
J F M A M J J A S O N D
AVERAGE FROST-FREE PERIOD
EARLIEST LAST SPRING FROST
LATEST SPRING FROST
EARLIEST FALL FROST
LATEST FIRST FALL FROST
MEAN TEMPERATURE
MEAN MAXIMUM
MEAN MINIMUM
RAINFALL
SNOWFALL
(WATER CONTENT AT 4)


POND INLET
PRECIPITATION IN INCHES
TEMPERATURE F°
J F M A M J J A S O N D
AVERAGE FROST-FREE PERIOD
EARLIEST LAST SPRING FROST
LATEST SPRING FROST
EARLIEST FALL FROST
LATEST FIRST FALL FROST
MEAN TEMPERATURE
MEAN MAXIMUM
MEAN MINIMUM
RAINFALL
SNOWFALL
(WATER CONTENT AT 4)


PANGNIRTUNG
PRECIPITATION IN INCHES
TEMPERATURE F°
J F M A M J J A S O N D
AVERAGE FROST-FREE PERIOD
EARLIEST LAST SPRING FROST
LATEST SPRING FROST
EARLIEST FALL FROST
LATEST FIRST FALL FROST
MEAN TEMPERATURE
MEAN MAXIMUM
MEAN MINIMUM
RAINFALL
SNOWFALL
(WATER CONTENT AT 4)


LAKE HARBOUR
PRECIPITATION IN INCHES
TEMPERATURE F°
J F M A M J J A S O N D
AVERAGE FROST-FREE PERIOD
EARLIEST LAST SPRING FROST
LATEST SPRING FROST
EARLIEST FALL FROST
LATEST FIRST FALL FROST
MEAN TEMPERATURE
MEAN MAXIMUM
MEAN MINIMUM
RAINFALL
SNOWFALL
(WATER CONTENT AT 4)


HAY RIVER
PRECIPITATION IN INCHES
TEMPERATURE F°
J F M A M J J A S O N D
AVERAGE FROST-FREE PERIOD
EARLIEST LAST SPRING FROST
LATEST SPRING FROST
EARLIEST FALL FROST
LATEST FIRST FALL FROST
MEAN TEMPERATURE
MEAN MAXIMUM
MEAN MINIMUM
RAINFALL
SNOWFALL
(WATER CONTENT AT 4)


CHESTERFIELD INLET
PRECIPITATION IN INCHES
TEMPERATURE F°
J F M A M J J A S O N D
AVERAGE FROST-FREE PERIOD
EARLIEST LAST SPRING FROST
LATEST SPRING FROST
EARLIEST FALL FROST
LATEST FIRST FALL FROST
MEAN TEMPERATURE
MEAN MAXIMUM
MEAN MINIMUM
RAINFALL
SNOWFALL
(WATER CONTENT AT 4)

Frost-free Period

Evening temperatures fall below the freezing-point occasionally in mid-August in the Northwest Territories, but the occurrence of first autumn frosts varies a great deal, depending upon local topographic conditions and air-mass movements. In both the eastern and western parts of the Territories, average first autumn frosts are recorded any time between early August and early September, and an occasional early frost has been recorded in July at each station. Frosts are caused by a cold air mass descending upon the region. If the cold air has been preceded by a warm, moist air mass, however, the low clouds which form will decrease the usual amount of evening cooling and the frosts will not occur. The chief difference in frost-free period between the eastern and western part of the Territories occurs in the spring; the Mackenzie Valley has its average last spring frosts in mid-June, while in the Eastern Arctic last spring frosts average late June or early July. (See accompanying climatic graphs.)

In the Mackenzie Valley the average frost-free period ranges from a minimum of 44 days at Fort Norman to a maximum of 92 days at Fort Resolution.[2] If one disregards early and late vagrant frosts and considers the growing season to be defined as the period during which mean daily minimum temperatures are above 32° and mean daily maximums above 43°, the Mackenzie Valley has an average growing season of 130 to 140 days. This period is about one month less than that recorded at the present northern limit of successful wheat growth in Saskatchewan.*

At the Western Arctic posts the frost-free period lasts from late June to early August, averaging 40 to 50 days in all. In the Hudson Bay region of the Eastern Arctic the frost-free period ranges from a maximum of 67 days at Chesterfield to 44 days at Port Harrison. The greatest hazard lies in the variability of first autumn frosts, which have occurred as early as August 2 and as late as September 17 at Chesterfield. The number of frost-free days at the Baffin Island settlements decreases northward from 48 days at Lake Harbour to 29 days at Pond Inlet.

Lack of agriculture in the Eastern Arctic is not only a result of frosts occurring in every month at most stations, but is also due to the lack of developed soil. Much of the area was scoured free of soil during the last Glacial Age, leaving typical bare-rock ridges. Where present-day streams have deposited soil in some of the valleys, the severity of the climate has prevented the collection of sufficient humus to encourage garden growth.

Precipitation

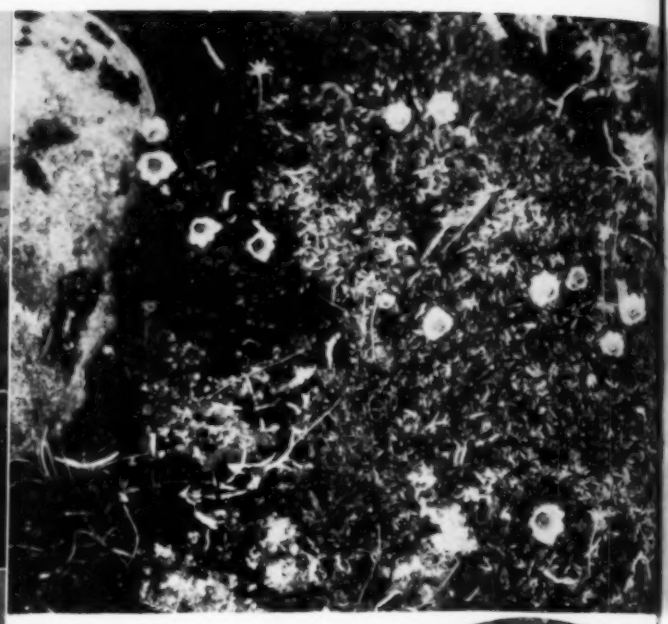
Average annual precipitation in the Northwest Territories is not high because the atmospheric conditions which cause precipitation do not often occur. In the first place, cold Arctic air does not contain as much water vapour as warm air. Secondly, these air masses, in moving southward, especially in summer, are becoming warmer rather than colder, and tend to absorb moisture rather than release it. Thus, in the Northwest Territories, precipitation usually occurs when warmer and moister air from the North Pacific (or North Atlantic, for the Eastern Arctic) enters the region and is cooled by rising over colder air masses from the Arctic. Since such warm air masses will already have lost some of their moisture in rising over the Rocky Mountains and Mackenzie Ranges, heavy precipitation will not be usual.

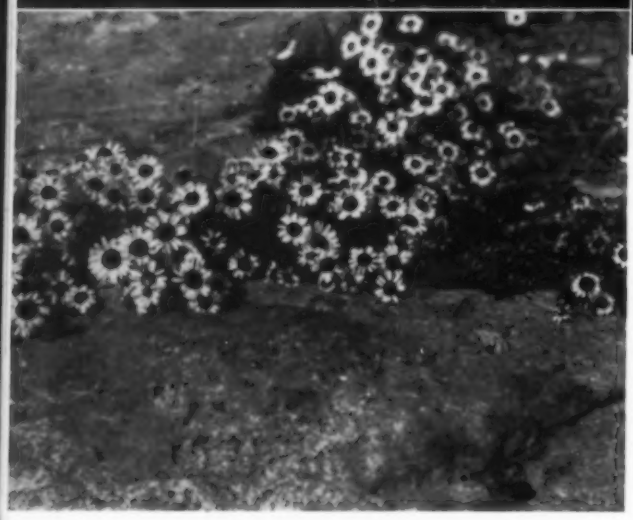
Rainfall

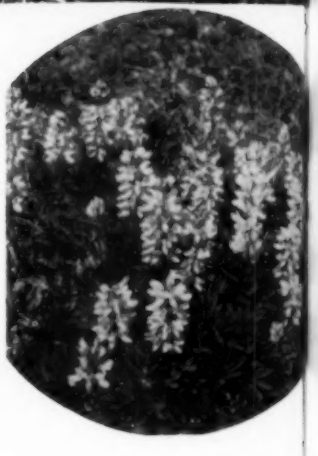
An annual average of 10 to 13 inches of precipitation is recorded at the Mackenzie Valley settlements, of which about forty to fifty per cent falls as rain during the four summer months. July is generally the wettest month, but this average of 1 to 2 inches of rain a month is scanty compared with the 2½ to 3 inches per month in agricultural regions like those in the vicinity of Ottawa, Toronto or Winnipeg.

Average precipitation is regionally distributed fairly evenly throughout the Mackenzie Valley, increasing slightly southward from 10 inches at Aklavik to 13 inches at Fort Smith. Agriculture in the Northwest

* Information compiled by A. J. Connor, Dominion Meteorological Service







Group of flowers in the Canadian Arctic

Upper left:—A field of Arctic cotton, Pond Inlet, Baffin Island

Upper right:—Mountain avens blooming at Bowman Bay, west coast of Baffin Island.

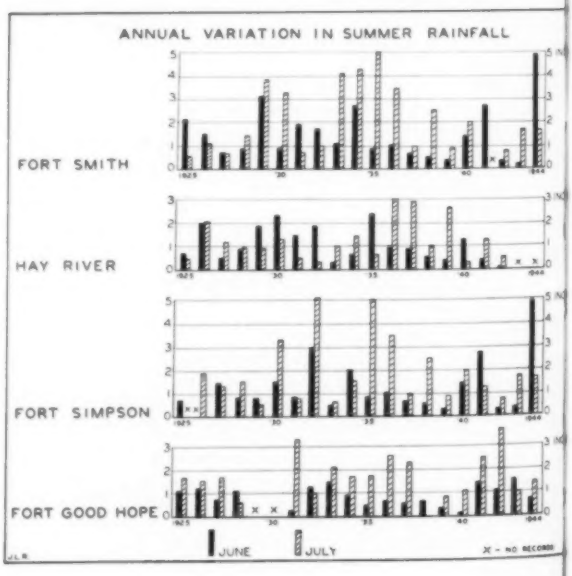
Left:—Arctic daisy in a grassy spot between rocks, Chesterfield Inlet

Right:—Lupins, north of Great Bear Lake

Dept. of Mines and Resources photos

is much concerned with the dependability of amounts which fall, as well as with averages. The accompanying chart illustrates that rainfall varies greatly from season to season, and even from place to place in the same season. Some stations have 3 or 4 inches of rain in one month of a year, and in the next year have less than 1 inch.

Rainfall is generally less in the Eastern Arctic and along the Western Arctic Coast (2 to 4 inches in a summer). Higher rainfall is recorded, however, in the southern Baffin Island and Hudson Strait areas, where 7 to 8 inches are deposited by moist winds from the south and east during the four summer months.



Snowfall

Snowfall is difficult to measure in northern Canada, where daily drifting of snow is quite common; the present records, especially in the Eastern Arctic, should be considered as only rough estimates. The Mackenzie Valley is often pictured as a region of deep snows, but the average of 40 to 60 inches of snow which falls there is actually similar to that which falls in Winnipeg (54 inches), and about half that which has been recorded in Toronto or Montreal. Snowfall is distributed fairly evenly throughout the winter months, and, because thawing is not usual, the snow may accumulate to a depth of 3 to 5 feet in the woods. Snowfall in the Mackenzie Valley is rare during June and August and (excluding Aklavik) is not known during July.

Snow falls chiefly during October and November in the Eastern Arctic, varying in amount from 30 to 60 inches at most stations. The southern Baffin Island stations again receive higher precipitation, recording 80 to 100 inches of snow. At most Eastern Arctic centres there is enough snow accumulated for dog-team travel after mid-November, although windy rock-ridges may remain bare all winter.

In the Arctic areas an occasional snow flurry has been recorded at most stations in July, and about a half-inch of snow is common in August. In general, in the Hudson Strait-Hudson Bay region, the land is free of snow during July, August and September. Farther north, in places along the northeast coast of Baffin Island, and most of the eastern sections of Devon and Ellesmere Islands, there are permanent snowfields and ice-caps which are, on a much smaller scale, similar to the permanent ice-cap of near-by Greenland.

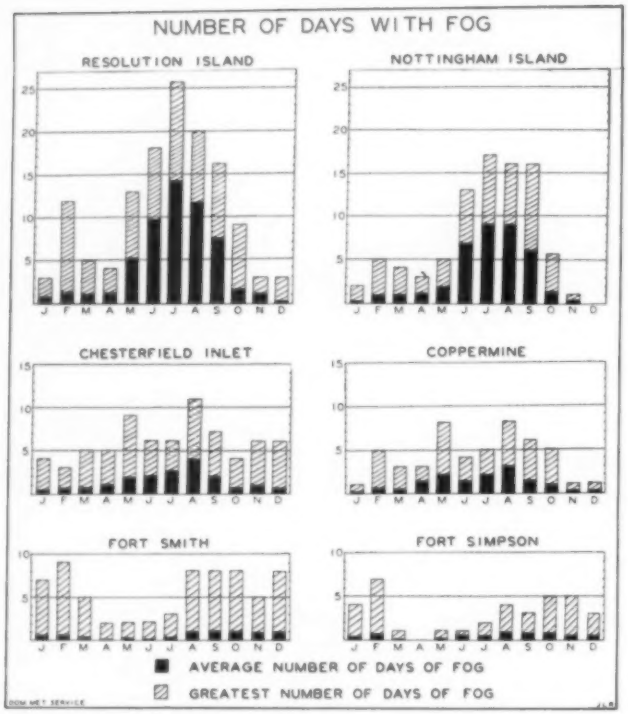
Winds

Prevailing wind directions are difficult to determine in the Eastern Arctic because most of the posts are located in sheltered areas where wind directions are controlled by some topographic feature. For example, Lake Harbour, located at the head of a 10-mile fiord extending northward into southern Baffin Island, shows a predominance of north and south winds, which may not be typical of the upland regions. In general, winter winds appear to blow chiefly from the north and northeast at the far-northern stations and from north and northwest in the Hudson Bay area. There is more variety in summer winds, due to the proximity of moving low-pressure air masses which sometimes follow a more northerly path from the Great Lakes across central Quebec in summer.

Arctic wind velocities are usually low during the summer and become stronger in the autumn and winter. Gales may last for several days during the winter, but, paradoxically, calms also occur most frequently in the winter when cold polar air masses stagnate over the region. Along certain steep Arctic coasts local winds of high velocity have been reported by exploratory expeditions. Cold air, from interior plateaux or mountains, being heavy, may descend rapidly to the water level, creating high velocities which will be felt for a few miles on either side of the coast.

In the Mackenzie Valley, winter winds blow predominantly from the northern and western quadrants. This is shown on the accompanying wind rose chart, which illustrates the percentage frequency of winds. Summer winds vary more in direction,

Fog rising from open water near loose ice-floes in Hudson Strait—an added hazard to July transportation.


NUMBER OF DAYS WITH FOG
RESOLUTION ISLAND
NOTTINGHAM ISLAND
CHESTERFIELD INLET
COPPERMINE
FORT SMITH
FORT SIMPSON
J F M A M J J A S O N D
AVERAGE NUMBER OF DAYS OF FOG
GREATEST NUMBER OF DAYS OF FOG

notably in having an increase in the number of easterly and southerly winds, in addition to the prevailing north and west winds. Calms are fairly evenly distributed throughout the year, and occur in about 15 to 30 per cent of twice-daily observations.

Fog

The prevalence of summer fog is one of the hazards of water and air transportation in the Eastern Arctic. When relatively warm air masses from the land come in contact with the cold Arctic waters of Hudson Bay and the Arctic Islands, condensation occurs, causing fog and low clouds to be frequent.

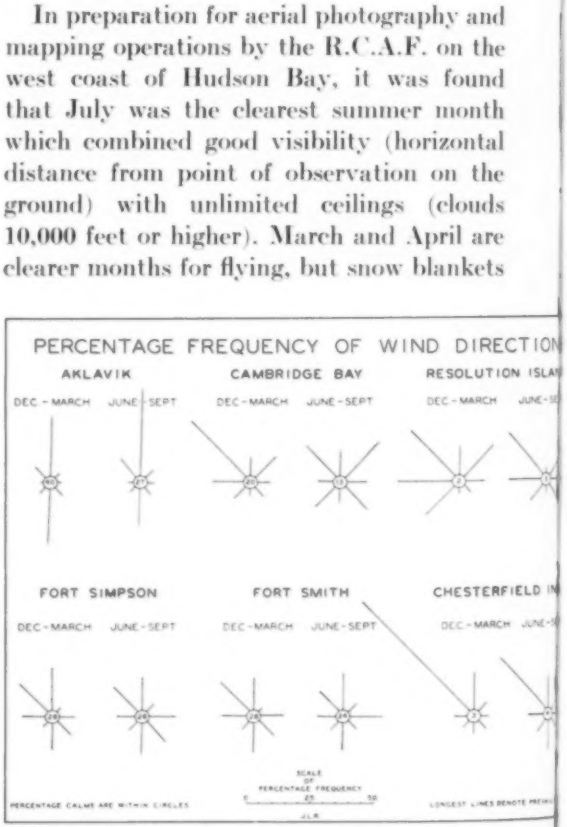
The accompanying fog charts show that July is usually the foggiest month. Fogs are fairly frequent in Hudson Strait during the summer, but are less common at the coastal stations of Chesterfield and Coppermine. Fogs occur less frequently at the Mackenzie Valley stations than at the coastal stations of the Arctic, although some months in the former region have recorded as many as eight days with fog.

Winter fogs are not usual at the present observing stations, where temperatures over the land and sea-ice are fairly equal. Local fogs, however, known as "sea-smoke", often occur over open water or at sea, and have been reported by winter travellers. Since relative humidity is fairly high in the Arctic, condensation may occur at any time when cooling air masses pass over the region. With this set of natural conditions, it is apparent that fog, which is a low-altitude form of condensation, will always be a problem hampering dependable transportation.

Ceiling and Visibility

Information regarding usual, and daily, ceilings and visibilities is of basic importance to air travel in northern Canada. All Department of Transport and Royal Canadian Corps of Signals stations in the Territories record these data as a daily service for the Royal Canadian Air Force and commercial companies. Much of the data, however, at present covers too short a period to present accurate averages.*

In preparation for aerial photography and mapping operations by the R.C.A.F. on the west coast of Hudson Bay, it was found that July was the clearest summer month which combined good visibility (horizontal distance from point of observation on the ground) with unlimited ceilings (clouds 10,000 feet or higher). March and April are clearer months for flying, but snow blankets



*Climatic data from each airport, if required for aviation, may be obtained upon request from the Meteorological Service of Canada.

the ground, making topographic features unrecognizable.

In Hudson Strait it is important for summer shipping to be familiar with the usual visibility which may be expected. At Nottingham Island, for example, there is an average of 23 days during each of the four summer months in which visibility is better than six miles at noon. This amount is slightly less at Resolution Island at the eastern entrance to the Strait. At all three stations, September to November has the highest percentage of good visibility, but unfortunately autumn storms are also more frequent during this period, hindering water transport.

Present air transportation is more concerned with facts describing ceilings and visibilities in Mackenzie District than with similar data concerning the Eastern Arctic. Recent hourly weather observations have been summarized for a short period and indicate that ceilings of over 10,000 feet are most common in August, but January and February have the highest percentage of cloudless days. Unlimited ceilings are less frequent during the autumn months of September to November.

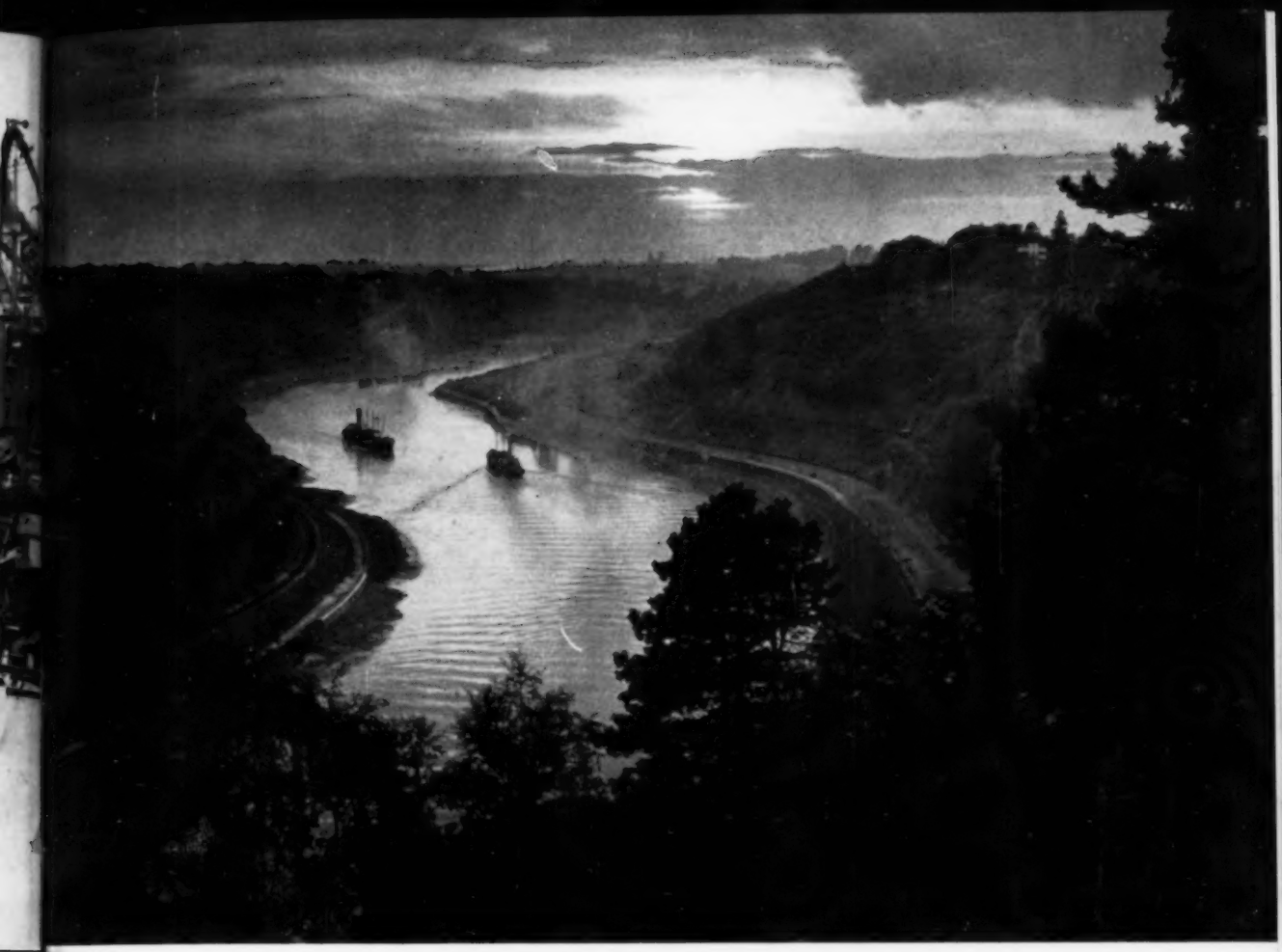
On the ground, good visibility increases during the spring and reaches a maximum in July and August, while visibilities are poorest during the months of November and December. In the clear days of spring, when bright sun and complete snow cover are combined, snow blindness is a serious problem for both natives and whites in the Arctic, unless snow goggles are worn.

Conclusion

Many misconceptions and mis-statements as to actual conditions and future possibilities of the Northwest Territories have been based upon an inadequate knowledge of climatic conditions. One of the causes of misunderstanding is undoubtedly the fact that the Territories comprise such a vast area (one-third of Canada) that the climate differs markedly from one region to another. The basic difference lies in the type and length of summer: the eastern areas are Arctic, but have a short, cool summer; the Northwest, despite its northern latitude, has summer periods often as warm as in more southerly parts of Canada.

It is undoubtedly true that the winters of the Northwest Territories are cold. They are not much colder in some regions, however, than in more densely settled sections of Canada, and improved heating techniques and insulated dwellings alleviate this disadvantage. Moreover, for many people the winters are definitely not uncomfortable, because the air is not damp, and the residents wisely dress warmly and suitably for low temperatures.

A knowledge of climate gives greater insight into the problems of the great Arctic and sub-Arctic areas of Canada. It helps to explain the difficulties resulting from ice conditions which hinder summer transportation, and the lack of agriculture to support an Eastern Arctic white population. In addition, if one appreciates that northwestern Canada is sub-Arctic, one realizes that man can carry on most of his usual activities as he does in more southerly regions. If resources are found which are rich enough to compete with those closer to present markets, climate will not be a principal obstacle impeding development of the Canadian Northwest.



On the evening tide—Bristol's famous Avon Gorge

Photo by H. A. Summers

Bristol—A City Seeking

by RUBY G. WATKINS

THERE is a city where each dawning day for the last one thousand years has meant the beginning of a quest. Each flaming sunset has closed another day of striving and achievement with a promise of fair tomorrows. The people of this city are imbued with a craving for self-expression—for fulfilment. It is a craving which has made them champions of religious revivals, political reforms, invention and discovery. The influence of their city has been felt in every corner of the globe, for it has bred great travellers and colonizers. There is a subtle allure in the slow, seaward-flowing tide, a plaintive calling of gulls that for long centuries has cast a spell upon the men of Bristol.

For this queen city of the west of England, ancient gateway to the Atlantic, was for many centuries one of the chief ports of the Christian world. It is still one of Britain's most important outlets to the western hemisphere.

Away back in history, intrepid men in cockle-shell boats set out from the old town, which then lay six miles down the River Avon, towards the seething, mountainous seas of the Atlantic, with no charts to guide them as they searched the unknown ocean

Top left:—Eastern arm, Royal Edward dock, Avonmouth
Bottom left:—An air view of Bristol City docks Photo by F. Bromhead

A general view of Avon Gorge, showing the suspension bridge.

Courtesy
Aero Pictorial Limited

for legendary lands and the rim of the world. Usually, they scouted up and down aimlessly, until John Cabot, more enterprising than the rest, sailed straight ahead into the west, reaching North America in 1497,

That, of course, started it all. Thereafter ships plied in ever increasing numbers across the ocean, taking settlers to the New World and returning with valuable cargo. Bristol had its share in the slave-trading and privateering escapades of those days, too.

Since then, Bristol has progressed beyond recognition. The town, which, in the twelfth century, grouped itself almost entirely within the confines of the city walls over 755 acres of low ground six miles from the sea, gradually expanded until, in the twentieth century, its boundaries enclose 24,381 acres, reaching to the sea. Inland docks still add a romantic touch to the life of the city; there ships flying the colours of Russia, Sweden and many lands anchor almost in the streets, their masts mingling with the spires of churches.

Transit granary and conveyer galleries, Royal Edward dock

Avon Gorge, entrance to Bristol City docks

Photo by F. Bromhead

Courtesy
Port of Bristol Authority

Farther out on the Bristol Channel newer docks have been developed, capable of berthing larger vessels and receiving immense quantities of cargo with the most modern handling and storage equipment. Here, during recent war years, passenger liners and hospital and American Army supply ships came. Tanks, guns, and all forms of military equipment, locomotives, etc., were both imported and exported. Bristol became a food-supply base for the island fortress that was Britain during those days when she stood alone. The city and port were frequently and heavily blitzed, but, in spite of every setback, continued to increase in functional value.

The whole life of Bristol has been woven around its port from earliest times. Now, with the war over, this state of affairs intensifies. Industries have grown up according to the raw materials which can be imported or the types of markets available for export, for Bristol is admirably situated geographically.

One of the port mills, Avonmouth docks

Photo by F. Bromhead

Left:—Abbey gateway, Bristol

Photo by Herbert Felton

Below:—Generations of sea-faring men have known this cobble-stone street with its quaint old houses and taverns.

Below:—"Lovers' Leap"—Blaise Castle Woods

Photo by H. A. Postlewaite

For the future, Bristol is scheduled to play a large part in Britain's export programme. Manufacturers are well aware of the great necessity of this. The war years taught them the worth of new systems of co-operation and mutual assistance which would once have been deemed impossible in the business world. The lessons learned in those times of dire necessity have carried over into this period, when they are just as vital to the country's survival.

Proof of the progressive attitude of the manufacturers in this matter came recently in the staging of the first peace-time trade exhibition, which was sponsored by the Bristol Engineering Manufacturers' Association, and attracted buyers and trade delegations of many nationalities, netting thousands of pounds worth of orders. The variety and excellence of Bristol-made goods is astonishing. Other manufacturers' associations will follow the engineers' lead, and the city's more than 300 diverse types of industry will play a prominent part in the Board of Trade's expansion policy.

One of the great difficulties with which the city is faced is the finding of homes for the many thousands of new families and for demobilized Armed Forces personnel coming here to take work in the large industrial plants. Over 3,000 homes were demolished and 46,000 damaged by enemy action. Added to the suspension of all building operations for six years, this has caused a grave problem.

Blitzed or expanding industries are also in desperate need of accommodation. Applications for sites and premises are constantly received from firms waiting to open up in the Bristol area as soon as space can be allocated to them. Negotiations are afoot for the acquiring of new land for these industrial and housing schemes. During the war years, when the needs of the expanding city were becoming apparent, the Town Planning Department, in consultation with industry and various organizations, began to draw up plans for an improved layout, and they were assisted in this by the Nazi bombers, which levelled many of the older, cramped districts of the city. The shopping area, with its picturesque crowded streets, too narrow for present-day needs, was almost completely destroyed.

Taking a quick glance at Bristol to-day, one is impressed by the innate grace and charm of the city, by its many green spaces and tree-lined streets, the magnificent views of the Avon Gorge, and the many beautiful churches. Yet, although the "Capital of the West" has a fine heritage of architecture, scenic charm and historical treasures, it is essentially progressive in outlook.

Among its many assets are a fine municipal airport with a romantic wartime story, a splendid modern university, schools and colleges. The Technical Colleges are valuable sources of recruitment for the industries which are housed (as are Fry's, the world-famous chocolate firm, and the Bristol Aeroplane Company) in factories that are models of progressive industrial planning and design.

Health has been given every consideration, large sums being spent on hospitals, clinics, and mass radiography.

Sports and amusement are extensively catered to, while within a radius of 50 miles lies some of the most beautiful scenery, both coastal and rural, to be found anywhere in England.

To sum up, the Bristol of to-day resembles the Bristol of one thousand years ago in only one respect. Its citizens are still progressive, and have the same spirit of enterprise which sent their ancestors out upon the seven seas in a quest—a quest often prompted by love of adventure rather than hope of reward.

Samuel Hearne Finds the Coppermine

by LAWRENCE J. BURPEE

SOME LITTLE TIME after he came out from England to Prince of Wales Fort, at the mouth of the Churchill River on Hudson Bay, a young man of twenty, in an idle moment, and perhaps with the thought that he might some day make his name memorable, carved in the hard rock near the fort—so deeply that they are still plainly visible—these words: "Sl Hearne July ye 1, 1767".

Samuel Hearne's big opportunity came sooner than he could have expected. In 1770 he was instructed by the Governor of the fort to go far to the north in search of certain copper mines of which the northern Indians had reported the existence to the Hudson's Bay Company. It was a long and difficult journey through country that had never before been seen by white men, and Hearne had no companion except Indians. Three times he set forth from Prince of Wales Fort. The first time his Indians deserted him before he had gone very far. The second time he was unfortunate enough to break his quadrant—an earlier form of the modern sextant—and was forced to return, as one of his main duties was to make a survey of his route.

Also on this second attempt he was visited and robbed by a party of northern Indians, the Chipewyan tribe. "Nothing", he says in his journal, "can exceed the cool deliberation of those villains; a committee of them entered my tent. The ringleader seated himself on my left-hand. They first begged me to lend them my skipertogan (a small bag in which pipe and tobacco, flint and steel, were carried) to fill a pipe of tobacco. After smoking two or three pipes, they asked me for several articles which I had not, and, amongst others, for a pack of cards; but on my answering that I had not any of the articles they mentioned, one of them put his hand on my baggage, and asked if it was mine. Before I could answer in the affirmative, he and the rest of his companions had all my treasure spread on the ground. One took one thing, and another another, till at last nothing was left but the empty bag, which they permitted me to keep.

"At length, considering that, though I was going to the Factory (Prince of Wales Fort), I should want a knife to cut my victuals, an awl to mend my shoes, and a needle to mend my other clothing, they readily gave me these other articles, though not without making me understand that I ought to look upon it as a great favour. Finding them possessed of so much generosity, I ventured to solicit them for my razors, but thinking that one would be sufficient to shave me during my passage home, they made no scruple to keep the other; luckily they kept the worst. To complete their generosity, they permitted me to take as much soap as I thought would be sufficient to wash and shave me during the remainder of my journey to the Factory."

At last Hearne got away from Prince of Wales on the final attempt. He now had the powerful help of a shrewd and experienced Indian named Matonabbee, as well as several of his followers. When Hearne talked over plans for the journey with the Chief, Matonabbee insisted that women must form part of the party. Hearne asked why this was necessary. "Why," said he, "women were made for labour; one of them can carry, or haul, as much as two men can do. They also pitch our tents, make and mend our clothing, keep us warm at night; and, in fact, there is no such thing as travelling any considerable distance, or for any length of time, in this country, without their assistance. Women, though

they do everything, are maintained at a trifling expense; for as they always stand cook, the very licking of their fingers, in scarce times, is sufficient for their subsistence."

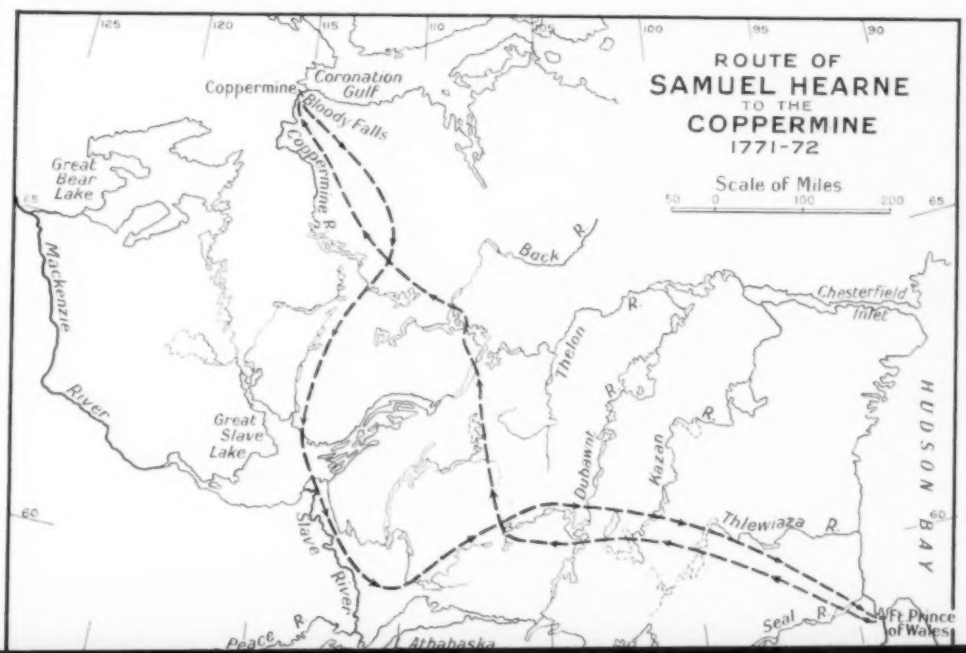
In spite of the fact that the travellers had women with them, the journey north through the Barren Lands was long and arduous, and at times the expedition was very close to starvation. Towards the end of the year they were completely without food for several days, not having been lucky enough to meet any of the migrating caribou. "I must confess", says Hearne, "that I never spent so dull a Christmas; and when I recollected the merry season which was then passing, and reflected on the immense quantities and great varieties of delicacies which were then expending in every part of Christendom, and that with a profusion bordering on waste, I could not refrain from wishing myself again in Europe, if it had been only to have had an opportunity of alleviating the extreme hunger which I suffered with the refuse of the table of any of my acquaintances."

Towards the middle of July, 1771, they reached the banks of a river which, because of the rich deposits of copper that were supposed to lie in its neighbourhood, was known as the Coppermine. Hearne travelled down this stream to where it emptied its waters into the Arctic. At a place that ever since has been known as Bloody Falls, some miles above the sea, they came to a village of Eskimo. Unfortunately the men were away hunting, and Hearne's Chipewyans, in spite of all he could do to prevent them, proceeded methodically to murder everyone in the village.

An old blind woman was sitting beside the river fishing for salmon. Because of the noise of the waterfall she knew nothing of what was going on. "When we first perceived her she seemed perfectly at ease, and was entirely surrounded with the product of her labour . . . It was in vain that she attempted to fly, for the wretches of my crew transfixed her to the ground in a few seconds, and butchered her in the most savage manner."

Hearne found some copper, but not enough to justify the hopes of the Hudson's Bay Company. It is now known that there are large deposits of the metal between the Coppermine and Great Bear Lake, but transportation costs are prohibitive.

On his return journey from the Coppermine to Prince of Wales Fort, Hearne followed a different route, travelling south to Great Slave Lake, then known to the Indians as Athapuscow, down Slave River for some distance, and then east to the mouth of the Churchill. The entire journey, which covered a gigantic triangle, was through unknown country, and some of it still remains unexplored since Hearne's day. The explorer lived to become Governor of Prince of Wales Fort, and in 1782 he was in command when it was captured by the French Admiral, La Pérouse.



EDITOR'S NOTE-BOOK

Paul Malles, writer and journalist, was born in Vienna, Austria. After studying law and economics at the University of Vienna he became Austrian correspondent for Scandinavian newspapers, from 1934 to 1937 was foreign correspondent in Prague for Central-Eastern and South-Eastern Europe, and from 1937 to 1941 was editorial writer and commentator on international politics in Stockholm. Mr. Malles has travelled widely in the Balkans, Central Europe, Scandinavia, Poland, Russia and Japan. In 1941 he came to Canada, and from 1942 until the end of the war participated in confidential war work for the Canadian Government. At present he is engaged in research work dealing with public finance and social security policies in various European countries for the Cabinet Committee on Dominion-Provincial Relations, Ottawa.

* * *

Victor W. von Hagen, author, explorer and ethnologist, was born in the United States and educated there, as well as in Great Britain and South America. He has conducted four major expeditions to Latin America, and before enlisting in the United States army published fifteen books. Mr. von Hagen also writes numerous magazine articles, and is contributing editor of *Science Illustrated* and the *Encyclopedia Americana*.

* * *

J. Lewis Robinson—See biographical sketch in C.G.J. for January, 1946.

* * *

Lawrence J. Burpee—See biographical sketch in January, 1946, issue.

AMONGST THE NEW BOOKS

Gauntlet to Overlord
by Ross Munro

(Macmillan Company of Canada, Toronto, $3.00)

On a busy morning in the autumn of 1939, a tall, slight young man with a quiet manner and a personality that inspired immediate confidence, presented himself at military headquarters in Ottawa. He wanted, he said, to serve in a combatant capacity overseas. Here, mused the interviewer, is excellent officer material, and he so reported. Recruiting, however, had been suspended at that particular period and before it was resumed Ross Munro had been appointed by the Canadian Press as one of its representatives overseas. Thus it was that Mr. Munro, instead of becoming a first class army officer, as he undoubtedly would have under other circumstances, became an internationally known war correspondent whose career is a newspaperman's Odyssey. Having followed his work over the war years and read his vivid story of the Canadian Army, one concludes that it would have been very difficult for him to have made a greater contribution in any other sphere than he did as a correspondent. Moreover, he endured hardship and subjected himself to personal danger in this capacity in a degree that would never have been required of him as a soldier. His qualities of heart and mind gained him the friendship and respect of all ranks to a very marked degree.

Gauntlet to Overlord is a book of absorbing interest not only to those about whom it is written but also to the general reader. It owes its title to the custom of identifying every military operation by a secret code name. "Gauntlet" was the first offensive operation undertaken by Canadian troops, and "Overlord" the last. The author carries his readers with the Canadian troops to Spitsbergen and back again, through the blazing cauldron of Dieppe, to North Africa, through the campaigns in Sicily and Italy, the great assault on the beaches of Normandy and the hard-fought battles which ended the war in Europe. The story is a factual record of the deeds of courageous young Canadians, and is told with fine reserve. Its authenticity is obvious. Readers who themselves participated in the events described will live again through stirring days and hear once more the thunder of the guns. Others who gave sons to the service will see the lives of their boys against the background of general army life and will more fully realize what they endured and achieved.

Beginning with an introduction covering the Normandy landings, continuing thereafter with nine chapters on the campaign in northwest Europe, and then reverting to earlier events, Mr. Munro's arrangement of his material will seem unusual to some readers. The explanation is probably to be found in the fact that the author is primarily a newspaperman trained to place the highlights of his story at the beginning of it. This departure from what might perhaps be regarded as orthodox in the book in no way detracts from its interest. Indeed one's whole attention is gripped and held by Mr. Munro's first sentence: "Through a boiling sea in the sullen hour after dawn, flotillas of landing craft splashed towards the beaches of Normandy". Thus, through page after page of fine descriptive writing, the story of how Canadian soldiers lived and fought and died is unfolded with faithful accuracy and a wealth of detail.

Turning from the final battles, he tells the story of the long training period in England clearly and well but with comparative brevity. Several most interesting pages are included in which the author sets out his understanding of the circumstances behind General MacNaughton's retirement from command of the

Army. In this regard it can only be observed that Mr. Munro was very close to the events which led up to this highly controversial issue and his account of it is both candid and plausible. The actual facts, whatever they may be, must await publication of the official record. It may also be observed of this chapter that more reference might well have been made to the great value of the work done by older officers and other ranks who were the bulwark of the army organization during the earlier years of the war. These gentlemen were popularly known among the younger generation as "retreads", and during 1942 and 1943 were somewhat ruthlessly replaced in field units. It is very noticeable, however, that the names of gallant commanders constantly recurring through the narrative are those of the young men who, as subalterns, were trained by such officers as Brigadier Milton Gregg, V.C., C.B.E., M.C., now President of the University of New Brunswick. Perhaps in future editions of the book this aspect of the training years may be included.

Concluding chapters contain a graphic account of the operations in Sicily and Italy, ending with the transfer of all Canadian troops from the Mediterranean theatre to western Europe which brought them "under the wing of an army that now more than ever before was truly a First Canadian Army". To sum up, *Gauntlet to Overlord* is a comprehensive record of the life of the Canadian Army overseas, brilliantly reported, and an enduring contribution to Canadian history. —C.B.T.

* * *

The Canada Year Book 1945

THE 1945 edition of this valuable reference volume, published by authority of the Hon. James A. MacKinnon, M.P., Minister of Trade and Commerce, has been announced by the Dominion Bureau of Statistics. The present edition continues the policy of giving such space as can be spared to feature articles of special importance, which imparts to the Year Book an encyclopaedic value over and above its significance as a statistical abstract.

The Canada Year Book (cloth-bound edition) is offered for sale to the public by the King's Printer, Ottawa, at $2.00 a copy. Remit by accepted cheque, money order, or postal note, payable to the Receiver General of Canada.

(A restricted number of paper-bound copies, at $1.00 each, has been made available for teachers, university students, and ministers of religion. Application to be addressed to: The Dominion Statistician, Dominion Bureau of Statistics, Ottawa.)

* * *

Andes Patagonicos (Viajes de Exploracion a la Cordillera Patagonica Austral) by ALBERTO M. DE AGOSTINI, S.S. Segunda Edicion Aumentada y Corregida, Ilustraciones y Mapas del Autor, Buenos Aires, 1945.

THE AUTHOR, who is an Italian by origin, has devoted almost thirty years to the exploration of the southern part of the Andean System and the western coast of South America from the Straits of Magellan northward to Lake Buenos Aires (in about latitude S.46°30′).

In *Andes Patagonicos* Father Agostini reviews the numerous expeditions in which he has explored this area. Between 1916 and 1943 he spent many years in the examination of the geography and geology of the region and has collected much interesting information on the flora and fauna and on the dwindling remnant of the Indians native to the country.

The first journey to be described is one made in a two-masted schooner through the Straits of Magellan and the narrow fjords and channels which thread the islands of the extreme southwest coast of Chile. The majority of the expeditions dealt with, however, are ascents of peaks and glaciers in the southern part of the Andean Range, the most outstanding single achievement being the conquest of Mount Lorenzo, 3,690 metres, in December 1943.

Scores of pictures taken by the author and original maps drawn by him give an excellent idea of the topography, rock formation, glaciers and vegetation of the country. One picture in particular, a complete photographic panorama taken from the summit of Cerro Mayo, illustrates most vividly the configuration of this section of the Andes.

There are some interesting discursive portions. One, for instance, describes the miserable life led by the Alacaluf Indians near Wellington Island, whose chief diet is mussels and other shell fish and almost only economic activity a trade in nutria; others tell of the attempts made by individual pioneers to start stock-raising enterprises and farms on both the Chilean and Argentine slopes of the Andes. The two final chapters contain respectively an historical account of the Patagonian Indians and of the missionary work done among them by the Brothers of the Salesian Order and the Sisters of Maria Auxiliadora, and a summary, illustrated by reproductions of old maps and pictures, of the achievements of Patagonian exploration.

The book is written in the form of a series of diaries of Father Agostini's individual expeditions, interspersed with a few sections of more general description. Owing to this method of narration, the work as a whole would leave a somewhat disjointed impression were it not for the pictures and maps. The inclusion of an index and a list of illustrations would have simplified access to the very interesting material contained in the volume. —D. BURWASH

* * *

Lower Deck by LIEUT. JOHN DAVIES, R.N.V.R. (MacMillan Company of Canada, Toronto, $2.50)

READERS who enjoyed *The Ship* will find in the present book another chapter in the long saga of the convoy route to Malta, written from the viewpoint of the lower deck by one who served on the lower deck of a destroyer. Here there is no attempt to describe strategy or tactics or to scan the battle as opposing fleets come into action. The lower deck only had a bearing and a range when the high-pitched order, "commence,

(*Continued on page XI*)

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(Continued from page X)

commence, commence", loosed the guns at some target seen only in the flickering flashes of its fire. Lieut. Davies is particularly impressive in his description of action: the sudden alarm caused by a surfaced submarine which wakes the ship from a monotonous patrol; the destroyer flotilla caught in a searchlight when creeping in to attack enemy ships on a hostile shore; and the final flaming hour when the destroyer is sunk on some unspecified landing operation.

We are honoured to meet, through Lieut. Davies, the citizens of the lower deck, grousing and grumbling, but enduring their hard way of life with the humour and tolerance that are, perhaps, the finest characteristics of the men of all our services. With them we see Malta, torn and ragged with bombs, the flesh pots of Alexandria, the day by day attacks from air and sea on the Malta-bound convoy, and we see, too, from a Carley raft, the destroyer which had been their care and their home slide into the deep under a hail of shells and bombs. Recommended reading. —P. E. P.

* * *

Johnny Chinook by ROBERT E. CARD
(Longmans, Green & Company, Toronto, $3.50)

The writer, a Kansan, "came to the University of Alberta", to quote the slipcover, "to conduct research into the folklore of Alberta and to conduct the Alberta Folklore and Local History Project under the sponsorship of the Rockefeller Foundation". It is evident that the directorate of the Rockefeller Foundation was well-advised in selecting Alberta as a field for study in folklore, for that province has long been famous as the habitat of tall tellers of tall tales. It is said to be the altitude that does it. In spite of the formal and academic robes in which Mr. Card entered the province, it is evident that he very shortly took off his necktie, loosened the collar of his shirt and began to "get around" with the boys. Certainly in this volume his approach to the folklore of Alberta is neither academic nor formal. He fails to indicate a single trend, or to trace even the faintest analogy, but is content to let the robust and earthy humour of that land of plains and foothills stand squarely on its own feet, a thing of itself, complete and apart.

The reviewer, like the chairman of a meeting, should not attempt to steal the author's thunder by quoting the most choice of his tales. It is his function to introduce the writer, give a description in the broadest terms of the subject matter and his opinion, fallible as are all opinions, of the effect and result the author obtains.

The first paragraph introduces the author, whose stories are those told in hotel lobbies, in pullman smokers, around camp fires under open skies, in barrooms and in all places where men congregate and are moved to explain themselves and the country in which they live. They range from the typical tall tale, through wit and humour to pathos, and even to bathos, not omitting the homely day-to-day routine of merely living, and even include a murder or two and Indian

legends redolent of the teepee. Mr. Card tells a story well; he shed his academic robes at the 49th parallel, and gives a vivid and lively picture of what Alberta likes to think itself to be and, to tell the truth, frequently is. It is to be regretted that he is a late-comer to the province, so that many of those salty characters of whom he writes had paid their debt to time before he could meet them.

They were not a tame generation, those pioneers of Alberta, and many of the best stories of their time were not of a type that would be admitted to a radio broadcast or lecture platform. It is to be hoped that such tales, too, have their place in folklore and that the author may sometime be moved to have his satellite, Johnny Chinook, cut a little closer to the bone and give a second instalment for a wider audience. In the meantime, our thanks to Mr. Card. —P. E. P.

* * *

Meet Your Ancestors

by Roy Chapman Andrews

(The Macmillan Company of Canada, $4.00)

Dr. Andrews, late Director of the American Museum of Natural History, and famous for his explorations in Central Asia, is not an anthropologist, but he has been closely associated with those scientists who have devoted themselves to the study of the earliest relics of humanity. As an interested observer, he is admirably qualified to trace the story of the slight knowledge we have so far acquired of our remote ancestors, and this he does with the zest and wholesome relish that has distinguished both his own life and his writings.

The first human remains have lain buried for perhaps a million years: a jawbone, a tooth, a part of a skull, found in Java, in China, in South Africa or England, measured, reconstructed, compared one with the other, the subject of dispute between authorities, but all in all adding up to some slight knowledge of man's existence in an inconceivably distant past. Later remains are more abundant and better preserved and we are able to reconstruct, with a fair degree of probability, the life of the Neanderthal man, who survived the Ice Age, and his successor, our immediate ancestor, the Cro-Magnon man, famous for his drawings in the caves of Europe.

Dr. Andrews clothes these dry bones with the living flesh of his own interest and enthusiasm, keeping as far away from technicalities and scientific latinisms as his subject will permit. The end product is an extremely readable book which will give the layman at least a glimpse of the progress that science has made in its search for the ultimate sources of the race.

—P. E. P.

* * *

Principles of Physical Geology

by Arthur Holmes, D.Sc., F.R.S.

(Ronald Press, New York, $4.00)

Among the various books that have appeared in recent years dealing with the subject of geology, the present one takes a very high place. Of convenient size, well

(Continued on page XIV)

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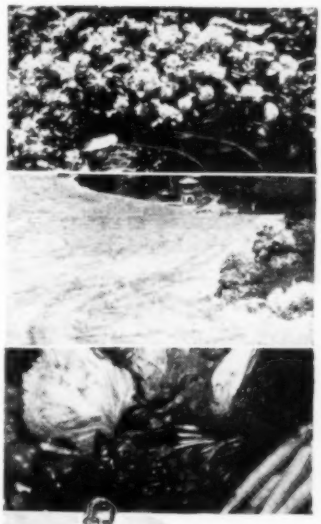

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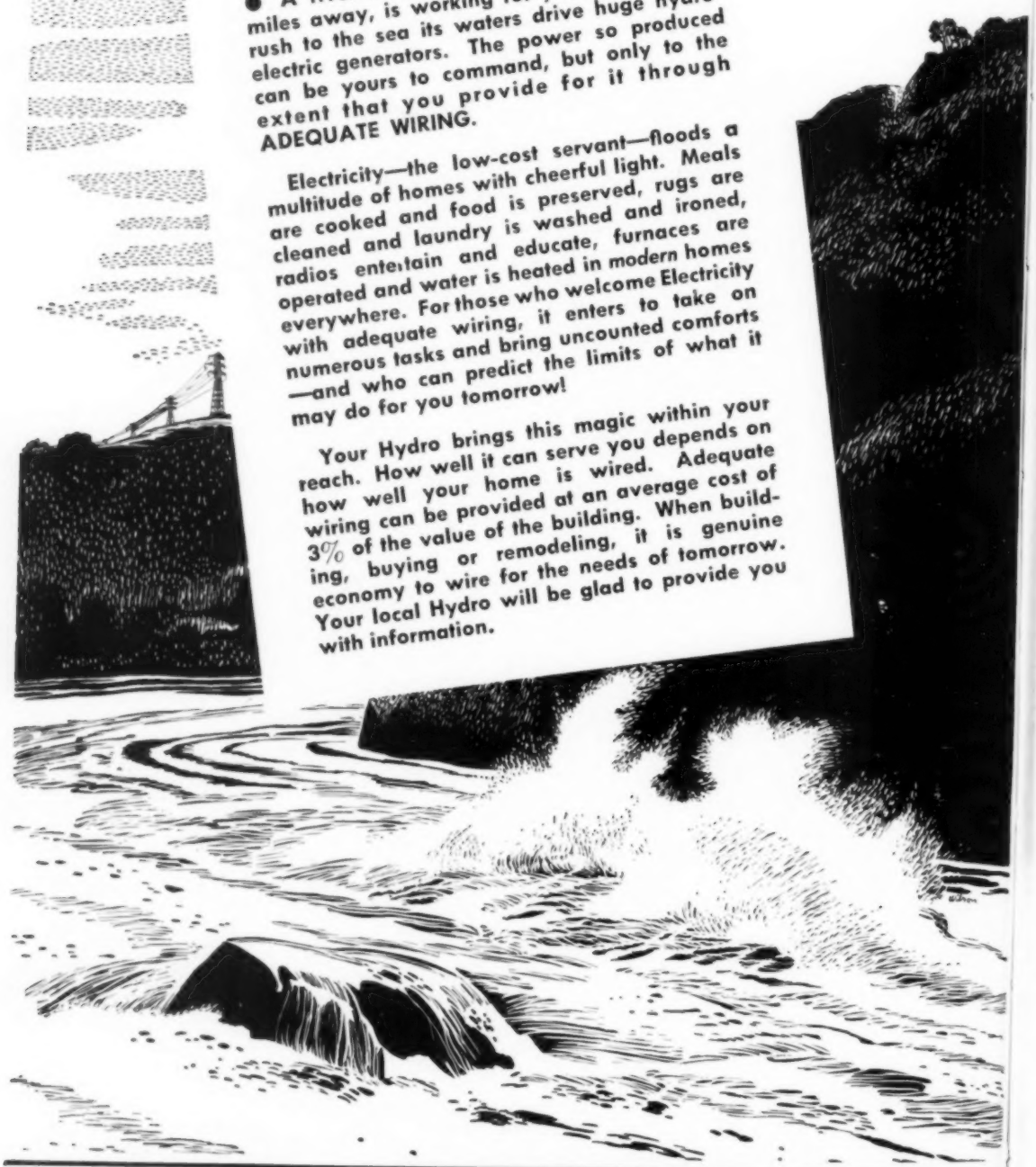

THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

(Continued from page XII)

written and well illustrated, it is a volume that everyone interested in earth science will read with pleasure and profit. The author is Regius Professor of Geology at the University of Edinburgh; former Chief Geologist, Yomah Oil Company, Burma; Lowell Lecturer, Harvard University; and correspondent of the Geological Society of America. He is the author of a number of other authoritative books on geological subjects, including *The Age of the Earth*, *Nomenclature of Petrology*, *Petrographic Methods*, and *Radioactivity and Geological Time*.

The volume is divided into three parts. The first is a broad preliminary survey serving as an introduction to the more detailed treatment that follows in the other two parts. It discusses the earth in general, its changing face, the materials composing it, rock structures, and how rocks serve as pages of the earth's history for the geologist to read and interpret. Part II deals with the processes at work on the surface of the earth and their effects, while Part III is concerned chiefly with activities going on beneath the surface: earthquakes; earth movements, orogenic and epeirogenic; volcanism, etc. The examples chosen to illustrate principles are taken from various parts of the world. Information regarding both fact and theory is up to date and discussion is concise and balanced. At the end of each chapter is a short list of references offered as suggestions for further reading.

Its illustrations add much to the attractiveness of the book. The 96 plates include many beautiful and striking scenes. Particularly valuable are the numerous figures and diagrams, over 200 of which were especially made for the volume. They are well drawn, easy to read, and materially assist the reader to follow the text.

—F. J. A.

* * *

Rocket and Jets
by HERBERT S. ZIM,
(Harcourt Brace & Co., $3.00)

WRITERS of books on scientific subjects are usually faced with the probability that their books will be out of date by the time they are printed. At the moment this applies particularly to a subject of such military importance as jet propulsion, for since V-E Day, and more particularly since V-J Day, there has been a lifting of military secrecy from many of the latest and most interesting jet developments. It should, therefore, be recognized at the outset that the primary function of a book on jet propulsion should be to delineate the subject in its proper historical and scientific perspective. This book is not too successful, from that point of view. The material is there, but it has been poorly organized.

Perhaps the major defect is a great reiteration of the same data. Either the author wrote it piecemeal, or he expected his readers to take it in small doses at one-month intervals. For one who reads more or less continuously the net gain per section drops rapidly after the first half-dozen chapters.

The author deals with jet devices under three main headings: powder-fuelled rockets, liquid-fuelled rockets, and jet engines (which depend upon outside air for their oxygen supply). Three famous military examples of these, the bazooka, the German V-2 and German V-1 flying bombs, are discussed in detail.

Chronologically, the book deals with the ancient history of rockets and jets (beginning with the legends about a flying pigeon made by Archytos, in 360 B.C.), the efforts of various amateur rocket societies during the last decade, the military developments of World War II, and future possibilities, including a discussion of interplanetary travel. Military devices form the chief topic of the several dozen photographs with which the book is illustrated.

—T. D. NORTHWOOD

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No longer in times of sickness would children have to suffer and perhaps die for the want of prompt medical attention or advice. No longer would the dawn to dusk toil of women be unrelieved by the sound of a friendly voice.

In the cities, businessmen were quick to make use of this new mode of communication. In rural areas the telephone was among the first of many inventions that were to bring the comforts and conveniences of urban life to the farmhouses of Canada.

Thus, the telephone was a g unifying element that bro Canadians together to work by side for the common g It fostered the co-operation was the foundation of the nati spirit of the pioneers and wh in the future, can and will be inspiration for the greater de opment of a Canada Unlim

Today in our purc and holding of Vic Bonds and War Sav Certificates, we h another unifying elem with which to b a shining future our nation.

Canada Unlimited

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One of a series depicting the growth of Canada as a nation, produced by O'Keefe's on the occasion of their 100th anniversary.

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